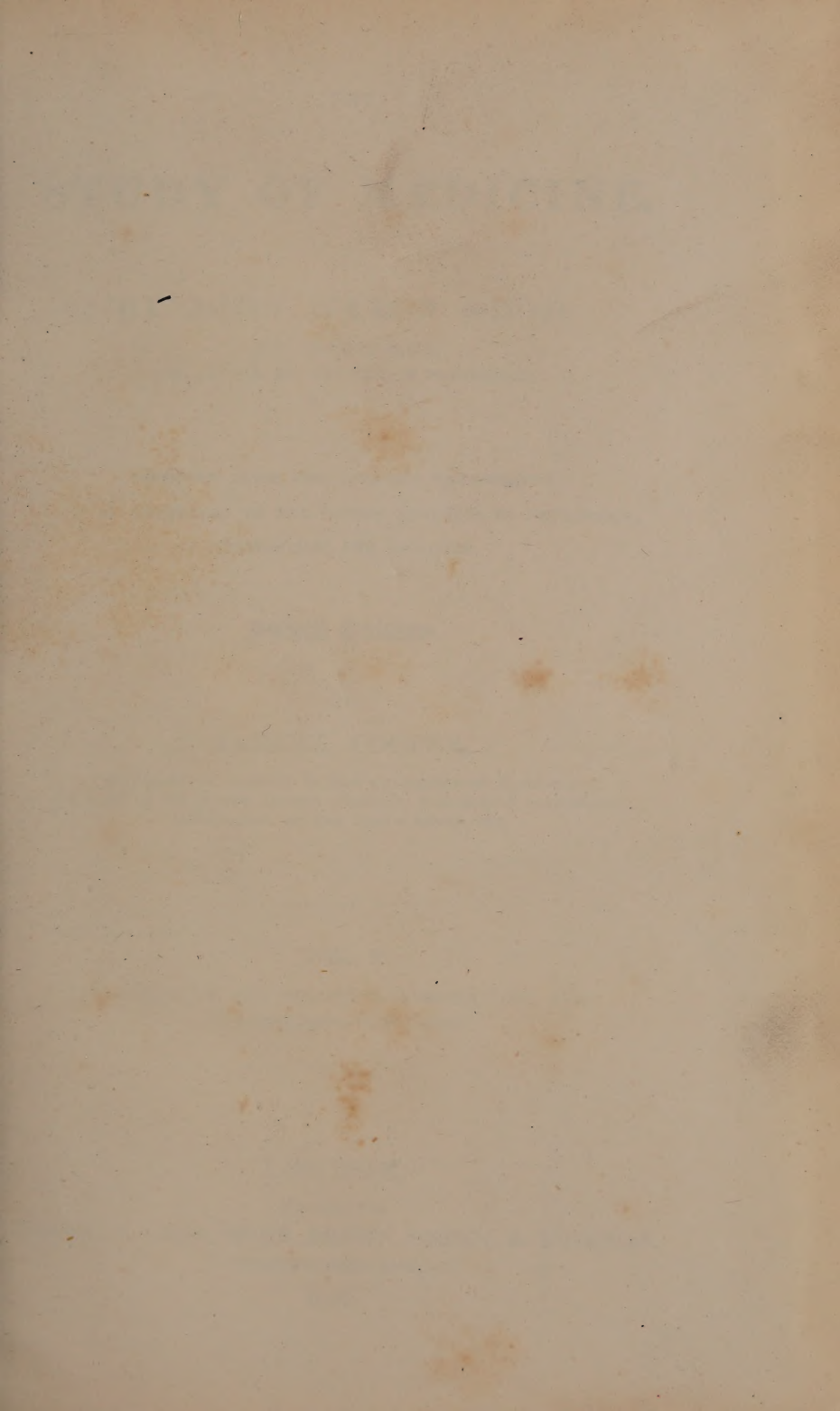


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THE
STUDY OF MEDICINE.

BY JOHN MASON GOOD,

M.D. F.R.S. F.R.S.L.

MEM. AM. PHIL. SOC. AND F.L.S. OF PHILADELPHIA.

IMPROVED FROM THE AUTHOR'S MANUSCRIPTS,
AND BY REFERENCE TO THE LATEST ADVANCES IN PHYSIOLOGY,
PATHOLOGY, AND PRACTICE.

Fourth Edition,

BY

SAMUEL COOPER,

PROFESSOR OF SURGERY IN THE UNIVERSITY OF LONDON;
SURGEON TO THE NORTH LONDON HOSPITAL, BLOOMSBURY DISPENSARY,
MARSHALSEA OF THE KING'S BENCH, ETC.

VOL. I.

DISEASES OF THE DIGESTIVE, RESPIRATORY, AND
SANGUINEOUS FUNCTIONS.

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STUDY OF MEDICINE

BY JOHN MAYOR GOOD



SAMUEL COOPER

VOL. I

LONDON:

LONDON:

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TO
SIR HENRY HALFORD, BART.

M.D. F.R.S. F.A.S.

PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS
OF LONDON,

PHYSICIAN TO THE KING;

THIS WORK

IS

INSCRIBED

AS

A TRIBUTE OF GRATITUDE AND FRIENDSHIP.

AUGUST VI. MDCCCXXII.

EDITOR'S PREFACE

TO

THE FOURTH EDITION.

WHEN the learned and very distinguished author of the "Study of Medicine," much to the regret of every lover of talent and worth, went to that bourn from which no traveller returns, he had already advanced a considerable way in preparations for a new edition of this his favourite production; one to which he had devoted a great portion of the latter part of his life. At the period of his death, he had revised all the five volumes, which the work then consisted of, and he had introduced into each of them numerous additional observations, tending to augment their utility and correctness. Various parts of the work, however, still demanded further attention, and none more so than its surgical articles. It was under these circumstances that I was requested by his family to make some arrangement with the booksellers, by which the third edition might be completed and published; and finding that Messrs. Underwood were ready to offer a fair consideration for the copyright, if I would give my assistance as editor, terms were agreed upon, and the undertaking was finished towards the close of 1829. After the failure of Messrs. Underwood, the copyright became the property of Messrs. Longman and Co., and the third edition having been entirely disposed of, a fourth has been called for, on which much time and labour have been expended. Subsequently to the date of the last edition, as it is scarcely necessary to explain, various important contributions have been made to medical science, bearing very materially upon some of the doctrines inculcated in the "Study of Medicine," sometimes corroborating, and, in

other instances, as must be confessed, invalidating, or even refuting them.

These stores of new and modern information, comprised in the writings of some of the most distinguished physiologists, pathologists, and medical practitioners of the present time, have been extensively resorted to for the correction and improvement of this system of physic. Whether I have exceeded the editorial functions, or whether too little or too much has been done, it is not for me, but the profession, to determine. One apprehension has constantly followed me in the task, namely, that of stepping over the bounds, within which every discreet editor ought to confine himself. On this account, I have not presumed to encroach upon the author's plan, which, whatever may be the defects in its execution, rests upon a solid foundation, and has the pleasing recommendation of originality. But although, with few exceptions, the arrangement of the subjects treated of has not been changed, I have sometimes ventured to express reasons for thinking some of them misplaced. With the same frankness, I have also stated the considerations, which have now and then inclined me not to adopt precisely the views entertained by the author on certain points in physiology, pathology, and the treatment of diseases. So far as my own knowledge extends, no celebrated writers on medicine have yet been able completely to avoid hypothesis; and, if the present author has occasionally soared into the regions of conjecture, he has only imitated all the greatest of his predecessors. For such flights every man, conscious of the difficulties of medical science, and aware of the zeal, perseverance, and active mind of the late Dr. Good, will readily find an excuse. If the general tenour of the book is good; if many parts of it are executed in a truly superior style, (their matter being daily referred to as high authority on the subjects to which they relate, and this by authors and lecturers of acknowledged judgment,) surely the imperfections of so difficult an undertaking will be indulgently disregarded by every liberal critic, and its genuine merit warmly admired. As a system of physic, adorned with learned research, it is, perhaps, unrivalled.

In this fourth edition, a great deal of new and interesting matter has been inserted, principally in the form of notes, in

order to avoid taking too much liberty with the text, or mutilating the work in a degree that seemed to me unwarrantable. I may also observe, with respect to incorporations in the text, that they are marked in such a manner, that the reader will immediately perceive the passages, for which my own character, and not that of Dr. Good, is responsible.

In the fourth volume will be found the particulars of an extraordinary case, under Mr. Thomas Law, of Penrith, in which innumerable portions of *tænia* have been voided, and still continue to be so, from the *meatus urinarius*; the only instance, I believe, of such an occurrence on record. Some of the specimens I mean to transmit to the Museum of the Royal College of Surgeons, and others to that of the University of London.

S. COOPER.

7. Woburn Place, Russell Square,
Nov. 1st. 1834.

PREFACE

TO

THE FIRST EDITION.

THE object of the present work is to unite the different branches of medical science, which, when carried to any considerable extent, have hitherto, by most writers, been treated of separately, into a general system, so that the whole may be contemplated under a single view, and pursued under a common study. These branches are the following : —

- I. PHYSIOLOGY, or the doctrine of the natural action of the living principle.
- II. PATHOLOGY, or the doctrine of its morbid action.
- III. NOSOLOGY, or the doctrine of the classification of diseases.
- IV. THERAPEUTICS, or the doctrine of their treatment and cure.

All these are of high, if not of equal, importance. As it is impossible for a workman to set about restoring a machine to order, with any rational hope of success, without knowing the full extent and nature of the injury it has sustained, so is it equally impossible for him to acquire this knowledge, unless he has also a knowledge of the structure of the machine, and has studied its several parts methodically, and in reference to the bearing which one part has upon another.

It is this advantage of the study of one part in relation to another that constitutes, or should constitute, in the art of medicine, the basis of NOSOLOGICAL ARRANGEMENT; for by grouping diseases, not arbitrarily, but in the order of connection in which they make their appearance in different functions, and the organs on which those functions depend, it is almost impossible to obtain an insight into the nature of any one disease belonging to such groups, without obtaining some insight into the nature of the rest, or tracing out some of the laws of morbid action which are common to the whole.

If it be convenient to concentrate the diseases of the nervous department into one division, as has been attempted

by many nosologists, and ably accomplished by Dr. Cullen, it is to be lamented that the same principle has not been allowed to pervade the whole of the nosological plan; and that the diseases of the other chief departments of the animal frame have not been concentrated in the same way, instead of being scattered, as we too often find them, over different divisions of a classification that is itself perpetually shifting from one ground of arrangement to another: which in one division, as in the Synopsis of Dr. Cullen, by far the best of his day, is derived from the temperature of the body; in a second, from its anatomical structure; in a third, from its chemical depravities; and in a fourth, from its topography: thus offering us in each division a new principle, and one that has no common clew, or analogy with the rest.

It was the hope of obtaining a clearer and more connected method than had hitherto been studied in the schools of medicine that induced the present author to turn his attention to this subject many years ago, and at length enabled him to submit to the public a System of Nosology founded entirely on a physiological basis, in which the diseases of the respective functions of the animal frame are connected in classes derived from those functions, and follow each other in the order in which physiologists have usually treated of them.

It was not, however, from a mere hope of obtaining a more exact and comprehensive synopsis of diseases that the author was induced to undertake this new arrangement, but with a view of employing it as a text-book for the collateral branches of the Art of Healing already adverted to, as soon as he should find leisure to enter upon them, and to which no other synopsis he was acquainted with seemed equally adapted.

This work was published in the beginning of 1817, under the title of a "Physiological System of Nosology, with a corrected and simplified Nomenclature;" and the favourable opinion which has been formed of it; its adoption as a text-book in various medical schools of high reputation in our own country, and on the Continent; the application which has been made to the author by some of the oldest and most established lecturers of this metropolis to print a syllabus of its classification for the purpose of lecturing from; and, above all, the approbation which the Royal College of Physicians has bestowed upon it, by permitting it to be dedicated to that learned body, after having been circulated amidst the Fellows of the College, under an express order of the late President, for an examination of its contents by every individual at his own house, are, he trusts, a sufficient apology for his adhering to his original intention, and taking this system, instead of any other, as the groundwork of the ensuing arrangement.

It is not necessary in the present place to enter into a minute explanation of the subordinate parts of this system, nor of the occasional changes in medical nomenclature which are to be found in it; and which a close attention to correctness and simplicity seemed to render indispensable. All these are fully illustrated in the Preliminary Dissertation to the volume of Nosology, which the author is desirous of having regarded as a part of the general design. An alteration in the distribution of one or two of the diseases, as originally laid down, may be noticed by an attentive eye in the present volumes. They are changes which have been made out of deference to the opinions of others, or from a maturer consideration of the subject by the author himself: but, upon the whole, they are too few and of too little importance to render it necessary to indicate them in the present place.

A pretty active spirit of PHYSIOLOGY will be found to pervade the entire work; but the author has, beyond this, availed himself of the advantage which his arrangement so readily allows, of prefixing to every class a summary of the most important laws and interesting discoveries of physiology that relate to, or can elucidate, the subjects which constitute its scope. And he has occasionally enriched the dissertation by a glance at the more striking analogies of the animal and even of the vegetable world at large, wherever they could add to the illustration.

In the PATHOLOGICAL DEPARTMENT, if the reader meet with an occasional development of new principles, a question as to several that have been long before the public, or a further extension of many that are well established, the author trusts that whatever doctrines are advanced will, at least, be found true to themselves, and form a digested system, operating in accordance through the entire work, in what way soever they may be affected by future investigations. He trusts it will also be found, that nothing is newly started for the mere sake of novelty, or controverted from a mere love of disputation: and that, whenever it has been his misfortune to differ from high authorities which have preceded him, he has done it with the candour which should peculiarly characterise a liberal profession. His main object has been to explain to the student the different subjects that pass before him, and to illustrate them by analogies, instead of confining himself to a dry and wearisome history of morbid symptoms and operations.

In THERAPEUTICS the author has allowed himself a liberal range, and has, occasionally, introduced into his *Materia Medica*, substances that are highly esteemed abroad, though little valued or even known at home, or that seem, without

reason, to have fallen into temporary disrepute. There are some practitioners who think that all the articles which are of real use in the cure of diseases lie within a small compass, and may be learnt without burthening the memory. This remark may be allowed to those who are limited to a portable dispensary, as in travelling, or on shipboard; but when uttered under other circumstances, it savours less of wisdom than of indolence. If the pharmacopœias of former times were too voluminous, and were occasionally loaded with medicines of trifling importance, the lopping and topping that must hereupon ensue would make a destructive inroad upon their boundaries, and take from them much that is good as well as something that can be spared. We may easily, indeed, substitute one medicine for another, but it is very rarely that we can hereby obtain an integral representative; a remedy, possessing not only the general but the particular qualities of that whose place is supplied, so as to be equally adapted to the exact state of the disease or the express character of the idiosyncrasy. Sir George Baker was engaged as reasonably and scientifically in examining into the virtues of the *cardamine pratensis*, or lady's smock, as Dr. Stoerck in proving, upon his own person, the violent powers of *colchicum* and *stramonium*. A common fate has, indeed, attended the whole of these experiments. From attracting and concentrating the attention of the public, the medicines to which they were directed became equally overvalued; were employed upon all occasions; produced frequent disappointment; and gradually fell into disuse. The *colchicum* has been fortunate enough to ascend once more to its full zenith of popularity; many efforts have been made on behalf of the *stramonium*; and the *cardamine*, though at present less successful than either of the others, still holds in abeyance its post in the established pharmacopœias, waiting for some lucky trial to bring it once more into general esteem.

A work, erected upon scientific principles, should know nothing of these accidental reverses, and still less of the varying and too often capricious taste of the day. To judge by the sentiments of some writers, the reputation of the bark seems at present on the wane, while the seeds of the *croton tiglium*, after a long neglect, are again rising into notice. In the remedial part of the present work, the author has endeavoured to allow to every medicine its proper value, as far as he has been able to estimate it, whatever may have been the era of its credit; and as there can be no stronger ground for the study of botany, oryctology, or chemistry, than the advantage they afford to the art of healing, and as these are provinces cultivated in our own day by almost every one, he has felt himself called upon by the general voice

of the times to range with some latitude over the medicinal stores afforded by art and nature, and to discriminate the respective properties of each, rather than to limit himself to a few leading productions, or to refer to the whole under the general divisions of stimulants, sedatives, and cathartics, or whatever other names may serve for a medicinal classification.

It is this, indeed, that after all must chiefly constitute the THERAPIA, or PRACTICE OF MEDICINE, to which every thing else, though of the utmost moment, is but introductory. "The First Lines" of Dr. Cullen, when read, as they were delivered, in connection with his "Treatise on the Materia Medica," constitute the most important course of instruction that has ever, perhaps, been laid down and completed by the same individual. But, for this purpose, they must be read together, though they were not published together, nor for the express design of forming a contemporaneous study: for it is a singular fact, that the First Lines of the Practice of Physic, though full both of mind and of matter, of elaborate axioms and theoretical principles, contain little of what the title suggests; while the Treatise on the Materia Medica, without making any pretensions to the subject, is altogether a practical work, replete with practical principles, and founded upon a practical investigation.

Whatever may be the theory or the practice advanced in the ensuing volumes, the author will generally be found to leave nothing upon trust; but to support or illustrate his assertions by authorities which he has endeavoured to give, with some degree of copiousness, from ancient as well as modern times: so as to render the work in a certain sense a summary of the general history of medicine in most ages and countries.

To the labours of our own countrymen, however, he professes to be chiefly indebted for his supplies: to the illustrious dead and to the illustrious living: to all of whom he has conscientiously endeavoured to do justice, even where he has been under the misfortune of differing from any of them in opinion. With the former he can have no controversy; and, with the latter, he has taken the most gratifying means of avoiding it, and at the same time of adding considerably to the value of his work, by submitting to the most distinguished of them, and especially to those with whom he has the honour of a personal acquaintance, the successive sheets of the work, while passing through the press, that contain a notice of their respective opinions or publications; with a request that they would correct any incidental mis-statement, or communicate any valuable hint that may since have occurred to them on the subject. It would occupy too much

space to enumerate all the individuals to whom the author has been indebted for assistance of this kind: but there are several whose names the public ought to be made acquainted with, as adding, in no ordinary degree, to the authority of the work itself.

He has, in the first place, to return his very grateful thanks to the President of the Royal College of Physicians, without whose fostering encouragement his health and strength, considerably encroached upon by the laborious and unremitting study with which it has been necessary to prosecute the subject, would hardly have held out to its close; and who has not only taken the trouble of examining the sheets that relate to his own valuable labours, but of watching the progress of the work generally, and of perusing many parts of it as they have issued from the press. He has next to offer his acknowledgments to his highly distinguished and venerable friend, Dr. Perceval, of Dublin; who has been so kind as to favour him with a valuable manuscript series of notes, in the form of a running commentary, upon the entire volume of Nosology, in illustration of its definitions or opinions; the whole of which will be found embodied into the present work, with a reference to the real author in every instance. To the liberality of Sir James M'Grigor he is indebted for important assistance on several occasions, and particularly for his munificent offer of a free and facilitated access to all the medical documents of the army, addressed to him as Director-General. To his kind friend, Sir John Webb, he is also largely indebted for similar assistance from the Ordnance Department, and particularly in respect to the subject of plague, upon which he has proved himself to be so perfectly conversant. The kindness of Dr. Baillie can never be erased from the author's memory, but he has particularly to thank him on the present occasion for reviewing the article on spasmodic stricture of the rectum, as well as several others, which, without his previous labours, would not perhaps have been found in the present work, or have been found but very imperfectly. To Dr. Latham he is under obligations on various accounts; but, in the present work, he is especially indebted to him for his friendly revision of the article *paruria mellita*, or *diabetes*. The volumes will display abundant instances in which he has derived assistance from the comprehensive mind of Sir Gilbert Blane, but the friendliness with which he has consented to furnish him with a description of his own case, in a very singular and obstinate attack of prurigo, and to revise the statement when printed, demands an especial acknowledgment. To Dr. Bree the author is indebted for perusing the article on asthma, and his very liberal opinion on the same. To Dr. Young

for a like attention to that on phthisis, and the valuable hints with which his opinion was accompanied. To Dr. Cooke, whose friendship he has experienced in many important instances, he is under a similar obligation for perusing, and, in a few instances, correcting the account of apoplexy and palsy: and to his excellent and judicious friend Dr. James Johnson, for various hints concerning tropical diseases, and a perusal of some parts of the present volumes in which they are treated of.

The author has entered with a considerable degree of fullness into the different modifications of diseases, in order to adapt the work to foreign climates and stations as well as to domestic practice: for a system of medicine, to be complete, should be of universal application. To render it such, however, it is seldom necessary to do more than follow up the common diseases of a country into their respective varieties: for the general laws of the morbid action of the living principle are as permanent and universal as those of its natural action, and a really new SPECIES of disease is, perhaps, as much a phenomenon as a really new species of plant or animal. We see all these infinitely diversified by accidental circumstances, and particularly the circumstances of habit and climate; but the specific outlines are still preserved, and we are still capable of reducing them, under every disguise, to their proper relations, and of assigning them their proper posts. From a few nondescript skeletons occasionally found in the bowels of the earth, and particularly from the interesting museum of such established by M. Cuvier at Paris, we have reason to believe that a few species of animals have totally disappeared; as we have also, from the classifications of recent naturalists compared with those of earlier times, that a few species are now in being which had no existence in remote ages. And in like manner, whilst a few species of diseases are now no longer to be found which are described by earlier writers, a few seem to have supplied their place, which are comparatively of modern origin. Yet, upon the whole, the march of nature is but little interfered with in either case; and hence the prognostics and aphorisms of Hippocrates, the medical histories of Aretæus and Galen, of Rhazes and Avicenna, and the natural histories of Aristotle and Pliny, are transcripts of animal life in our own day, as well as in the times in which they were severally composed; and form important subjects of modern as it is well known they did of ancient study. The extensive family of fevers and spasmodic affections are, in the main, the same now as they are represented in the most ancient writings that have descended to us; the plague of Athens, as described by Thucydides, we shall find in the ensuing pages to be the prototype of

what still occasionally takes place in Egypt and along the Barbary coast; and even the leprosy of the Levitical law, so minutely described by Moses, will be found, when the passage is closely and accurately rendered, still to retain its hold in the East, and to exhibit even the very same modifications as are noticed by the Hebrew legislator, and have been intermediately assigned to it by Celsus.

TABLE
OF
CLASSIFICATION.

CLASS I. CŒLIACA.

DISEASES OF THE DIGESTIVE FUNCTION.

ORD. I. ENTERICA.

AFFECTING THE ALIMENTARY CANAL.

GEN. I. ODONTIA.

MISDENTITION.

SPEC. 1. O. DENTITIONIS.

Teething.

2. DOLOROSA.

Tooth-ache.

3. STUPORIS.

Tooth-edge.

4. DEFORMIS.

Deformity of the Teeth.

5. EDENTULA.

Toothlessness.

6. INCRUSTANS.

Tartar of the Teeth.

7. EXCRESCENS.

Excrescent Gums.

II. PTYALISMUS.

PTYALISM.

SPEC. 1. P. ACUTUS.

Salivation.

2. INERS.

Drivelling.

III. DYSPHAGIA.

DYSPHAGY.

SPEC. 1. D. CONSTRICTA.

Constrictive Dysphagy.

2. ATONICA.

Atonic Dysphagy.

CLASS I. CÆLIACA.

ORD. I. ENTERICA.

GEN. III. DYSPHAGIA.

SPEC. 3. D. GLOBOSA.

Nervous Quinsy.

4. UVULOSA.

Uvular Dysphagy.

5. LINGUOSA.

Lingual Dysphagy.

6. PHARYNGEA.

Pharyngeal Dysphagy.

IV. DIPSOSIS.

MORBID THIRST.

SPEC. 1. D. AVENS.

Immoderate Thirst.

2. EXPERS.

Thirstlessness.

V. LIMOSIS.

MORBID APPETITE.

SPEC. 1. L. AVENS.

Voracity.

2. EXPERS.

Long Fasting.

3. PICA.

Depraved Appetite.

4. CARDIALGIA.

*Heart-burn. Water-brash.**Cardialgy.*

5. FLATUS.

Flatulency.

6. EMESIS.

Sickness. Vomiting.

7. DYSPEPSIA.

Indigestion.

VI. COLICA.

COLIC.

SPEC. 1. C. ILEUS.

Ileac Passion.

2. RHACHIALGIA.

Colic of Poictou. Painter's Colic.

3. CIBARIA.

Surfeit.

4. FLATULENTA.

Wind Colic.

5. CONSTIPATA.

Constipated Colic.

6. C. CONSTRICTA.

Constrictive Colic.

CLASS I. CÆLIACA.

ORD. I. ENTERICA.

GEN. VII. COPROSTASIS.
COSTIVENESS.

- SPEC. 1. C. CONSTIPATA.
Constipation.
2. OBSTIPATA.
Obstipation.

VIII. DIARRHŒA.
LOOSENESS.

- SPEC. 1. D. FUSA.
Feculent Looseness.
2. BILIOSA.
Bilious Looseness.
3. MUCOSA.
Mucous Looseness.
4. ALBA.
White Looseness.
5. LIENTERIA.
Lientery.
6. SEROSA.
Serous Looseness.
7. TUBULARIS.
Tubular Looseness.

IX. CHOLERA.
CHOLERA.

- SPEC. 1. C. BILIOSA.
Bilious Cholera.
2. FLATULENTA.
Wind Cholera.
3. SPASMODICA.
Spasmodic Cholera.

X. ENTEROLITHUS.
INTESTINAL CONCRETIONS.

- SPEC. 1. E. BEZOARDUS.
Bezoar.
2. CALCULUS.
Intestinal Calculus.
3. SCYBALUM.
Scybalum.

XI. HELMINTHIA.
WORMS.

- SPEC. 1. H. ALVI.
Alvine Worms.

CLASS I. CŒLIACA.

ORD. I. ENTERICA.

GEN. XI. HELMINTHIA.

SPEC. 2. H. PODICIS.
*Anal Worms.*3. ERRATICA.
Erratic Worms.

XII. PROCTICA.

DISEASES ABOUT THE ANUS.

SPEC. 1. P. SPASMODICA.

*Spasmodic Stricture of the Rectum.*2. CALLOSA.
*Callous Stricture of the Rectum.*3. TENESMUS.
*Tenesmus.*4. MARISCA.
*Piles.*5. EXANIA.
Prolapse of the Fundament.

ORD. II. SPLANCHNICA.

AFFECTING THE COLLATITIOUS VISCERA.

GEN. I. ICTERUS.

YELLOW JAUNDICE.

SPEC. 1. I. CHOLŒUS.

*Biliary Jaundice.*2. CHOLOLITHICUS.
*Gall-stone Jaundice.*3. SPASMODICUS.
*Spasmodic Jaundice.*4. HEPATICUS.
*Hepatic Jaundice.*5. INFANTUM.
Jaundice of Infants.

II. MELÆNA.

MELENA.

SPEC. 1. M. CHOLŒA.

*Black or Green Jaundice.*2. CRUENTA.
Black Vomit.

III. CHOLOLITHUS.

GALL-STONE.

SPEC. 1. C. QUIESCENS.

Quiescent Gall-stone.

CLASS I. CÆLIACA.

ORD. II. SPLANCHNICA.

GEN. III. CHOLOLITHUS.

SPEC. 2. C. MEANS.

Passing of Gall-stones.

IV. PARABYSMA.

VISCERAL TURGESCECE.

SPEC. 1. P. HEPATICUM.

Turgescence of the Liver.

2. SPLENICUM.

Turgescence of the Spleen.

3. PANCREATICUM.

Turgescence of the Pancreas.

4. MESENTERICUM.

Turgescence of the Mesentery.

5. INTESTINALE.

Turgescence of the Intestines.

6. OMENTALE.

Turgescence of the Omentum.

7. COMPLICATUM.

Turgescence compounded of various organs.

CLASS II. PNEUMATICA.

DISEASES OF THE RESPIRATORY FUNCTION.

ORD. I. PHONICA.

AFFECTING THE VOCAL AVENUES.

GEN. I. CORYZA.

RUNNING AT THE NOSE.

SPEC. 1. C. ENTONICA.

Entonic Coryza.

2. ATONICA.

Atonic Coryza.

II. POLYPUS.

POLYPUS.

SPEC. 1. P. ELASTICUS.

Compressible Polypus.

2. CORIACEUS.

Cartilaginous Polypus.

III. RHONCHUS.

RATTLING IN THE THROAT.

SPEC. 1. R. STERTOR.

Snoring.

2. CERCHNOS.

Wheezing.

CLASS II. PNEUMATICA.

ORD. I. PHONICA.

GEN. IV. APHONIA.

DUMBNESS.

SPEC. 1. A. ELINGUIUM.

Elingual Dumbness.

2. ATONICA.

Atonic Dumbness.

3. SURDORUM.

Deaf Dumbness.

V. DYSPHONIA.

DISSONANT VOICE.

SPEC. 1. D. SUSURRANS.

Whispering Voice.

2. PUBERUM.

Voice of Puberty.

3. IMMODULATA.

Immelodious Voice.

VI. PSELLISMUS.

DISSONANT SPEECH.

SPEC. 1. P. BAMBALIA.

Stammering.

2. BLESITAS.

Misnunciation.

ORD. II. PNEUMONICA.

AFFECTING THE LUNGS, THEIR MEMBRANES, OR
MOTIVE POWER.

GEN. I. BEX.

COUGH.

SPEC. 1. B. HUMIDA.

Common or humid Cough.

2. SICCA.

Dry Cough.

3. CONVULSIVA.

Hooping Cough.

II. LARYNGYSMUS.

LARYNGIC SUFFOCATION.

SPEC. 1. L. STRIDULUS.

*Stridulous Constriction of the
Larynx.*

III. DYSPNŒA.

ANHELATION.

SPEC. 1. D. CHRONICA.

Short Breath.

2. EXACERBANS.

Exacerbating Anhelation.

CLASS II. PNEUMATICA.

ORD. II. PNEUMONICA.

GEN. IV. ASTHMA.
ASTHMA.

SPEC. 1. A. SICCOM.

Dry or Nervous Asthma.

2. HUMIDUM.

*Humid or common Asthma.*V. EPHIALTES
INCUBUS.

SPEC. 1. E. VIGILANTIUM.

Day-Mare.

2. NOCTURNUS.

*Night-Mare.*VI. STERNALGIA.
SUFFOCATIVE BREAST-PANG.

SPEC. 1. S. AMBULANTIUM.

Acute Breast-Pang.

2. CHRONICA.

*Chronic Breast-Pang.*VII. PLEURALGIA.
PAIN IN THE SIDE.

SPEC. 1. P. ACUTA.

Stitch.

2. CHRONICA.

Chronic Pain in the Side.

CLASS III. HÆMATICA.

DISEASES OF THE SANGUINEOUS FUNCTION.

ORD. I. PYRECTICA.

FEVERS.

GEN. I. EPHEMERA
DIARY FEVER.

SPEC. 1. E. MITIS.

Mild Diary Fever.

2. ACUTA.

Acute Diary Fever.

3. SUDATORIA.

*Sweating Fever.*II. ANETUS.
INTERMITTING FEVER.
AGUE.

SPEC. 1. A. QUOTIDIANUS.

Quotidian Ague.

CLASS III. HÆMATICA.

ORD. I. PYRECTICA.

GEN. II. ANETUS.

SPEC. 2. A. TERTIANUS.

Tertian Ague.

3. QUARTANUS.

Quartan Ague.

4. ERRATICUS.

Irregular Ague.

5. COMPLICATUS.

Complicated Ague.

III. EPANETUS.

REMITTENT FEVER.

SPEC. 1. E. MITIS.

Mild Remittent.

2. MALIGNUS.

*Malignant Remittent.**

3. HECTICUS.

Hectic Fever.

IV. ENECIA.

CONTINUED FEVER.

SPEC. 1. E. CAUMA.

Inflammatory Fever.

2. TYPHUS.

Typhus Fever.

3. SYNOCHUS.

Synochal Fever.

ORD. II. PHLOGOTICA.

INFLAMMATIONS.

GEN. I. APOSTEMA.

APOSTEME.

SPEC. 1. A. COMMUNE.

Common Aposteme.

2. PSOATICUM.

Psoas Abscess.

3. HEPATICUM.

Abscess of the Liver.

4. EMPYEMA.

Lodgment of Matter in the Chest.

5. VOMICA.

Vomica.

* α Autumnal Remittent. β Yellow Fever. γ Burning Remittent. δ Athenic Remittent.

CLASS III. HÆMATICA.

ORD. II. PHLOGOTICA.

GEN. II. PHLEGMONE.

PHLEGMON.

SPEC. 1. P. COMMUNIS.

Common Phlegmon.

2. PARULIS.

Gum-boil.

3. PAROTIDEA.

Parotid Phlegmon.

4. MAMMÆ.

Abscess of the Breast.

5. BUBO.

Bubo.

6. PHIMOTICA.

Phimotic Phlegmon.

III. PHYMA.

TUBER.

SPEC. 1. P. HORDEOLUM.

Sty.

2. FURUNCULUS.

Boil.

3. SYCOSIS.

Ficous Phyma.

4. ANTHRAX.

Carbuncle.

IV. IONTHUS.

WHELK.

SPEC. 1. I. VARUS.

Stone-pock.

2. CORYMBYFER.

Carbuncled Face. Rosy Drop.

V. PHLYSIS.

PHLYSIS.

SPEC. 1. P. PARONYCHIA.

Whitlow.

VI. ERYTHEMA.

INFLAMMATORY BLUSH.

SPEC. 1. E. ŒDEMATOSUM.

Edematous Erythema.

2. ERYSIPELATOSUM.

Erysipelatous Erythema.

3. GANGRÆNOSUM.

Gangrenous Erythema.

4. VESICULARE.

Vesicular Erythema.

CLASS III. HÆMATICA.

ORD. II. PHLOGOTICA.

GEN. VI. ERYTHEMA.

SPEC. 5. E. ANATOMICUM.

Erythema from Dissection.

6. PERNIO.

Chilblain.

7. INTERTRIGO.

Fret.

VII. EMPRESMA.

VISCERAL INFLAMMATION.

SPEC. 1. E. CEPHALITIS.

*Inflammation of the Brain.**

2. OTITIS.

Earach.

3. PAROTITIS.

Mumps.

4. PARISTHMITIS.

Quinsy.

5. LARYNGITIS.

Inflammation of the Larynx.

6. BRONCHLEMMITIS.

Croup.

7. PNEUMONITIS.

Peripneumony.

8. PLEURITIS.

Pleurisy.

9. CARDITIS.

Inflammation of the Heart.

10. PERITONITIS.

Inflammation of the Peritonæum.

11. GASTRITIS.

Inflammation of the Stomach.

12. ENTERITIS.

Inflammation of the Bowels.

13. HEPATITIS.

Inflammation of the Liver.

14. SPLENITIS.

Inflammation of the Spleen.

15. NEPHRITIS.

Inflammation of the Kidneys.

16. CYSTITIS.

Inflammation of the Bladder.

17. HYSTERITIS.

Inflammation of the Womb.

18. ORCHITIS.

*Inflammation of the Testicle.** α Brain Fever. β Acute Dropsy of the Head.

CLASS III. HÆMATICA.

ORD. II. PHLOGOTICA.

GEN. VIII. OPHTHALMIA.
OPHTHALMY.

SPEC. 1. OPHTHALMITIS.

Inflammation of the whole Eyeball.

2. EXTERNA.

Inflammation of the external Tunics.

3. INTERNA.

*Inflammation of the internal Parts
of the Eye.*

4. STAPHYLOMA.

Protuberant Eye.

5. ECTROPIUM.

Everted Eyelid.

6. ENTROPIUM.

Inverted Eyelid.

IX. CATARRHUS.

CATARRH.

SPEC. 1. C. COMMUNIS.

Cold in the Head or Che t.

2. EPIDEMICUS.

Influenza.

X. DYSENTERIA.

DYSENTERY.

SPEC. 1. D. ACUTA.

Acute Dysentery.

2. CHRONICA.

Chronic Dysentery.

XI. BUCNEMIA.

TUMID LEG.

SPEC. 1. B. SPARGANOSIS.

Puerperal Tumid Leg.

2. TROPICA.

Tumid Leg of hot Climates.

XII. ARTHROSIA.

ARTICULAR INFLAMMATION.

SPEC. 1. A. ACUTA.

Acute Rheumatism.

2. CHRONICA.

Chronic Rheumatism.

3. PODAGRA.

Gout.

4. HYDARTHROS.

White-swelling.

CLASS III. HÆMATICA.

ORD. III. EXANTHEMATICA.

ERUPTIVE FEVERS. EXANTHEMS.

GEN. I. ENANTHESIS.

RASH EXANTHEM.

- SPEC. 1. E. ROSALIA.
Scarlet Fever.
2. RUBEOLA.
Measles.
3. URTICARIA.
Nettle Rash.

II. EMPHLYSIS.

ICHOROUS EXANTHEM.

- SPEC. 1. E. MILIARIA.
Miliary Fever.
2. APHTHA.
Thrush.
3. VACCINIA.
Cow Pox.
4. VARICELLA.
Water Pox.
5. PEMPHIGUS.
Vesicular, or Bladdery Fever.
6. ERYSIPELAS.
St. Anthony's Fire.

III. EMPYESIS.

PUSTULOUS EXANTHEM.

- SPEC. 1. E. VARIOLA.
Small Pox.

IV. ANTHRACIA.

CARBUNCULAR EXANTHEM.

- SPEC. 1. A. PESTIS.
Plague.
2. RUBULA.
Yaws.

ORD. IV. DYSTHETICA.

CACHEXIES.

GEN. I. PLETHORA.

PLETHORA.

- SPEC. 1. P. ENTONICA.
Sanguine Plethora.
2. ATONICA.
Serous Plethora.

CLASS III. HÆMATICA.

ORD. IV. DYSTHETICA.

GEN. II. HÆMORRHAGIA.
HEMORRHAGE.

- SPEC. 1. H. ENTONICA.
Entonic Hemorrhage.
2. ATONICA.
Atonic Hemorrhage.

III. MARASMUS.
EMACIATION.

- SPEC. 1. M. ATROPHIA.
Atrophy.
2. ANHÆMIA.
Exsanguinity.
3. CLIMACTERICUS.
Decay of Nature.
4. TABES.
Decline.
5. PHTHISIS.
Consumption.

IV. MELANOSIS.
MELANOSE.

- SPEC. 1. M. TUBERCULARIS.
Tubercular Melanose.

V. STRUMA.
SCROPHULA.

- SPEC. 1. S. VULGARIS.
King's Evil.

VI. CARCINUS.
CANCER.

- SPEC. 1. C. VULGARIS.
Common Cancer.

GEN. VII. LUES.
VENEREAL DISEASE.

- SPEC. 1. L. SYPHILIS.
Pox.
2. SYPHILODES.
Bastard Pox.

VIII. ELEPHANTIASIS.
ELEPHANT SKIN.

- SPEC. 1. E. ARABICA.
Arabian Elephantiasis. Black Leprosy.

CLASS III. HÆMATICA.

ORD. IV. DYSTHETICA.

GEN. VIII. ELEPHANTIASIS.

SPEC. 2. E. ITALICA.

Italian Elephantiasis.

3. ASTURIENSIS.

Asturian Elephantiasis.

IX. CATACAUSIS.

CATACAUSIS.

SPEC. 1. C. EBRIOSA.

Inebriate Catacausis.

X. PORPHYRA.

SCURVY.

SPEC. 1. P. SIMPLEX.

Petechial Scurvy.

2. HÆMORRHAGICA.

Land Scurvy.

3. NAUTICA.

Sea Scurvy.

XI. EXANGIA.

EXANGIA.

SPEC. 1. E. ANEURISMA.

Aneurism.

2. E. VARIX.

Varix.

3. CYANIA.

Blue-skin.

XII. GANGRÆNA.

GANGRENE.

SPEC. 1. G. SPHACELUS.

Mortification.

2. USTILAGINEA.

Mildew Mortification.

3. NECROSIS.

Dry Gangrene.

4. CRIES.

Caries.

XIII. ULCUS.

ULCER.

SPEC. 1. U. INCARNANS.

Simple healing Ulcer.

2. VITIOSUM.

Depraved Ulcer.

3. SINUOSUM.

Sinuuous Ulcer.

CLASS III. HÆMATICA.

ORD. IV. DYSTHETICA.

GEN. XIII. ULCUS.

- SPEC. 4. U. TUBERCULOSUM.
Warty excrescent Ulcer.
5. CARIOSUM.
Carious Ulcer.
-

CLASS IV. NEUROTICA.

DISEASES OF THE NERVOUS FUNCTION.

ORD. I. PHRENICA.

AFFECTING THE INTELLECT.

GEN. I. ECPHRONIA.

INSANITY. CRAZINESS.

- SPEC. 1. E. MELANCHOLIA.
Melancholy.

2. MANIA.
Madness.

II. EMPATHEMA.

UNGOVERNABLE PASSION.

- SPEC. 1. E. ENTONICUM.
Impassioned Excitement.

2. ATONICUM.
Impassioned Depression.

3. INANE.
Hare-brained Passion.

III. ALUSIA.

ILLUSION. HALLUCINATION.

- SPEC. 1. A. ELATIO.
Sentimentalism. Mental Extravagance.

2. HYPOCHONDRIAS.
Hypochondrism. Low Spirits.

IV. APHELXIA.

REVERY.

- SPEC. 1. A. SOCORS.
Absence of Mind.

2. INTENTA.
Abstraction of Mind.

3. OTIOSA.
Brown Study.

CLASS IV. NEUROTICA.

ORD. I. PHRENICA.

GEN. V. PARONIRIA.

SLEEP DISTURBANCE.

SPEC. 1. P. AMBULANS.

Sleep-walking.

2. LOQUENS.

Sleep-talking.

3. SALAX.

Night Pollution.

VI. MORIA.

FATUITY.

SPEC. 1. M. IMBECILIS.

Imbecility.

2. DEMENS.

Irrationality.

ORD. II. ÆSTHETICA.

AFFECTING THE SENSATION.

GEN. I. PAROPSIS.

MORBID SIGHT.

SPEC. 1. P. LUCIFUGA.

Night Sight.

2. NOCTIFUGA.

Day Sight.

3. LONGINQUA.

Long Sight.

4. PROPINQUA.

Short Sight.

5. LATERALIS.

Skew Sight.

6. ILLUSORIA.

False Sight.

7. CALIGO.

Opaque Cornea.

8. GLAUCOSIS.

Humoral Opacity.

9. CATARACTA.

Cataract.

10. SYNIZESIS.

Closed Pupil.

11. AMAUROSIS.

Drop Serene.

12. STRABISMUS.

Squinting.

CLASS IV. NEUROTICA.

ORD. II. ÆSTHETICA.

GEN. II. PARACUSIS.

MORBID HEARING.

SPEC. 1. P. ACRIS.

Acrid Hearing.

2. OBTUSA.

Hardness of Hearing.

3. PERVERSA.

Perverse Hearing.

4. DUPLICATA.

Double Hearing.

5. ILLUSORIA.

Imaginary Sounds.

6. SURDITAS.

Deafness.

III. PAROSMIS.

MORBID SMELL.

SPEC. 1. P. ACRIS.

Acrid Smell.

2. OBTUSA.

Obtuse Smell.

3. EXPERS.

Want of Smell.

IV. PARAGEUSIS.

MORBID TASTE.

SPEC. 1. P. ACRIS.

Acrid Taste.

2. OBTUSA.

Obtuse Taste.

3. EXPERS.

Want of Taste.

V. PARAPSIS.

MORBID TOUCH.

SPEC. 1. P. ACRIS.

Acrid Sense of Touch or general Feeling.

2. EXPERS.

Insensibility of Touch or general Feeling.

3. ILLUSORIA.

Illusory Sense of Touch or general Feeling.

CLASS IV. NEUROTICA.

ORD. II. ÆSTHETICA.

GEN. VI. NEURALGIA.
NERVE-ACHE.

SPEC. 1. N. FACIEL.

Nerve-ache of the Face.

2. PEDIS.

Nerve-ache of the Foot.

3. MAMMÆ.

Nerve-ache of the Breast.

ORD. III. CINETICA.

AFFECTING THE MUSCLES.

GEN. I. ENTASIA.

CONSTRUCTIVE SPASM.

SPEC. 1. E. PRIAPISMUS.

Priapism.

2. LOXIA.

Wry-neck.

3. RHACHYBIA.

Muscular Distortion of the Spine.

4. ARTICULARIS.

Muscular Stiff-joint.

5. SYSTREMMMA.

Cramp.

6. TRISMUS.

Locked-jaw.

7. TETANUS.

Tetanus.

8. LYSSA.

Rabies. Canine Madness.

9. ACROTISMUS.

Suppressed Pulse.

II. CLONUS.

CLONIC SPASM.

SPEC. 1. C. SINGULTUS.

Hiccough.

2. STERNUTATIO.

Sneezing.

3. PALPITATIO.

Palpitation.

4. NICTITATIO.

Twinkling of the Eyelids.

5. SUBSULTUS.

Twitches of the Tendons.

6. PANDICULATIO.

Stretching.

CLASS IV. NEUROTICA.

ORD. III. CINETICA.

GEN. III. SYNCLONUS.

SYNCLONIC SPASM.

SPEC. 1. S. TREMOR.

Trembling.

2. CHOREA.

St. Vitus's Dance.

3. BALLISMUS.

Shaking Palsy.

4. RAPHANIA.

Raphania.

5. BERIBERIA.

Barbiers.

ORD. IV. SYSTATICA.

AFFECTING SEVERAL OR ALL THE SENSORIAL
POWERS SIMULTANEOUSLY.

GEN. I. AGRYPNIA.

SLEEPLESSNESS.

SPEC. 1. A. EXCITATA.

Irritative Wakefulness.

2. PERTÆSA.

Chronic Wakefulness.

II. DYSPHORIA.

RESTLESSNESS.

SPEC. 1. D. SIMPLEX.

Fidgets.

2. ANXIETAS.

Anxiety.

III. ANTIPATHIA.

ANTIPATHY.

SPEC. 1. A. SENSILIS.

Sensile Antipathy.

2. INSENSILIS.

Insensile Antipathy.

IV. CEPHALÆA.

HEADACH.

SPEC. 1. C. GRAVANS.

Stupid Headach.

2. INTENSA.

Chronic Headach.

3. HEMICRANIA.

Megrim.

CLASS IV. NEUROTICA.

ORD. IV. SYSTATICA.

GEN. IV. CEPHALÆA.

- SPEC. 4. C. PULSATILIS.
Throbbing Headach.
 5. NAUSEOSA.
Sick Headach.

V. DINUS.
DIZZINESS.

- SPEC. 1. D. VERTIGO.
Vertigo.

VI. SYNCOPE.
SYNCOPE.

- SPEC. 1. S. SIMPLEX.
Swooning.
 2. RECURRENS.
Fainting-fit.

VII. SYSPASIA.
COMATOSE SPASM.

- SPEC. 1. S. CONVULSIO.
Convulsion.
 2. HYSTERIA.
Hysterics.
 3. EPILEPSIA.
Epilepsy.

VIII. CARUS.
TORPOR.

- SPEC. 1. C. ASPHYXIA.
Asphyxy. Suspended Animation.
 2. ECSTASIS.
Ecstasy.
 3. CATALEPSIA.
Catalepsy.
 4. LETHARGUS.
Lethargy.
 5. APOPLEXIA.
Apoplexy.
 6. PARALYSIS.
Palsy.

CLASS V. GENETICA.

DISEASES OF THE SEXUAL FUNCTION.

ORD. I. CENOTICA.

AFFECTING THE FLUIDS.

GEN. I. PARAMENIA.

MISMENSTRUATION.

SPEC. 1. P. OBSTRUCTIONIS.

Obstructed Menstruation.

2. DIFFICILIS.

Laborious Menstruation.

3. SUPERFLUA.

Excessive Menstruation.

4. ERRORIS.

Vicarious Menstruation.

5. CESSATIONIS.

Irregular Cessation of the Menses.

II. LEUCORRHOEA.

WHITES.

SPEC. 1. L. COMMUNIS.

Common Whites.

2. NABOTHI.

Labour-show.

3. SENESCENTIUM.

Whites of advanced Life.

III. BLENORRHOEA.

GONORRHOEA.

SPEC. 1. B. SIMPLEX.

Simple urethral Running.

2. LUODES.

Clap.

3. CHRONICA.

Gleet.

IV. SPERMORRHOEA.

SEMINAL FLUX.

SPEC. 1. S. ENTONICA.

Entonic Seminal Flux.

2. ATONICA.

Atonic Seminal Flux.

V. GALACTIA.

MISLACTATION.

SPEC. 1. G. PRÆMATURA.

Premature Milk-flow.

2. DEFECTIVA.

Deficient Milk-flow.

3. DEPRAVATA.

Depraved Milk-flow.

CLASS V. GENETICA.

ORD. I. CENOTICA.

GEN. V. GALACTIA.

SPEC. 4. G. ERRATICA.

Erratic Milk-flow.

5. VIRORUM.

Milk-flow in Males.

ORD. II. ORGASTICA.

AFFECTING THE ORGASM.

GEN. I. CHLOROSIS.

GREEN SICKNESS.

SPEC. 1. C. ENTONICA.

Entonic Green Sickness.

2. ATONICA.

Atonic Green Sickness.

II. PRÆOTIA.

GENITAL PRECOCITY.

SPEC. 1. P. MASCULINA.

Male Precocity.

2. FEMININA.

Female Precocity.

III. LAGNESIS.

LUST.

SPEC. 1. L. SALACITAS.

Salacity.

2. FUROR.

Lascivious Madness.

IV. AGENESIA.

MALE STERILITY.

SPEC. 1. A. IMPOTENS.

Male Impotency.

2. DYSPERMIA.

Seminal Misemission.

3. INCONGRUA.

Copulative Incongruity.

V. APHORIA.

FEMALE STERILITY. BARRENNESS.

SPEC. 1. A. IMPOTENS.

Barrenness of Impotency.

2. PARAMENICA.

Barrenness of Mismenstruation.

3. INPERCITA.

Barrenness of Irresponsence.

CLASS V. GENETICA.

ORD. II. ORGASTICA.

GEN. V. APHORIA.

SPEC. 4. INCONGRUA.

Barrenness of Incongruity.

VI. ÆDOPTOSIS.

GENITAL PROLAPSE.

SPEC. 1. A. UTERI.

Falling down of the Womb.

2. VAGINÆ.

Prolapse of the Vagina.

3. VESICÆ.

Prolapse of the Bladder.

4. COMPLICATA.

Complicated Genital Prolapse.

5. POLYPOSA.

Genital Excrescence.

ORD. III. CARPOTICA.

AFFECTING THE IMPREGNATION.

GEN. I. PARACYSIS.

MORBID PREGNANCY.

SPEC. 1. P. IRRITATIVA.

*Constitutional Derangement of
Pregnancy.*

2. UTERINA.

Local Derangement of Pregnancy.

3. ABORTUS.

Abortion.

II. PARODYNIA.

MORBID LABOUR.

SPEC. 1. P. ATONICA.

Atonic Labour.

2. IMPLASTICA.

Unpliant Labour.

3. SYMPATHETICA.

Complicated Labour.

4. PERVERSA.

Preternatural Presentation.

5. AMORPHICA.

Impracticable Labour.

6. PLURALIS.

Multiply Labour.

7. SECUNDARIA.

Sequential Labour.

CLASS V. GENETICA.

ORD. III. CARPOTICA.

GEN. III. ECCYESIS.

EXTRA-UTERINE FETATION.

SPEC. 1. E. OVARIA.

Ovarian Exfetation.

2. TUBALIS.

Tubal Exfetation.

3. ABDOMINALIS.

Abdominal Exfetation.

IV. PSEUDOCYESIS.

SPURIOUS PREGNANCY.

SPEC. 1. P. MOLARIS.

Mole.

2. INANIS.

False Conception.

CLASS VI. ECCRITICA.

DISEASES OF THE EXCERNENT FUNCTION.

ORD. I. MESOTICA.

AFFECTING THE PARENCHYMA.

GEN. I. POLYSARCIA.

CORPULENCY.

SPEC. 1. P. ADIPOSA.

Obesity.

II. EMPHYMA.

TUMOUR.

SPEC. 1. E. SARCOMA.

Sarcomatous Tumour.

2. ENCYSTIS.

Encysted Tumour.

3. EXOSTOSIS.

Bony Tumour.

III. PAROSTIA.

MIS-OSSIFICATION.

SPEC. 1. P. FRAGILIS.

Fragility of the Bones.

2. FLEXILIS.

Flexility of the Bones.

CLASS VI. ECCRITICA.

ORD. I. MESOTICA.

GEN. IV. CYRTOSIS.

CONTORTION OF THE BONES.

SPEC. 1. C. RHACHIA.

Rickets.

2. CRETINISMUS.

Cretinism.

- V. OSTHEXIA.

OSTHEXY.

SPEC. 1. O. INFARCIENS.

Parenchymatous Osthexy.

2. IMPLEXA.

Vascular Osthexy.

ORD. II. CATOTICA.

AFFECTING INTERNAL SURFACES.

GEN. I. HYDROPS.

DROPSY.

SPEC. 1. H. CELLULARIS.

Cellular Dropsy.

2. CAPITIS.

Dropsy of the Head.

3. SPINÆ.

Dropsy of the Spine.

4. THORACIS.

Dropsy of the Chest.

5. ABDOMINIS.

Dropsy of the Belly.

6. OVARII.

Dropsy of the Ovaries.

7. TUBALIS.

Dropsy of the Fallopian Tubes.

8. UTERI.

Dropsy of the Womb.

9. SCROTI.

Dropsy of the Scrotum.

II. EMPHYSEMA.

INFLATION. WIND DROPSY.

SPEC. 1. E. CELLULARE.

Cellular Inflation.

2. ABDOMINIS.

Tympany.

III. PARURIA.

MIS-MICTURITION.

SPEC. 1. P. INOPS.

Destitution of Urine.

CLASS VI. ECCRITICA.

ORD. II. CATOTICA.

GEN. III. PARURIA.

SPEC. 2. P. RETENTIONIS.

Stoppage of Urine.

3. STILLATITIA.

Strangury.

4. MELLITA.

Saccharine Urine. Diabetes.

5. INCONTINENS.

Incontinence of Urine.

6. INCOCTA.

Unassimilated Urine.

7. ERRATICA.

Erratic Urine.

IV. LITHIA.

URINARY CALCULUS.

SPEC. 1. L. RENALIS.

Renal Calculus.

2. VESICALIS.

Stone in the Bladder.

ORD. III. ACROTICA.

AFFECTING THE EXTERNAL SURFACE.

GEN. I. EPIDROSIS.

MORBID SWEAT.

SPEC. 1. E. PROFUSA.

Profuse Sweat.

2. CRUENTA.

Bloody Sweat.

3. PARTIALIS.

Partial Sweat.

4. DISCOLOR.

Coloured Sweat.

5. OLENS.

Scented Sweat.

6. ARENOSA.

Sandy Sweat.

II. EXANTHESIS.

CUTANEOUS BLUSH.

SPEC. 1. E. ROSEOLA.

Rose Rash.

III. EXORMIA

PAPULOUS SKIN.

SPEC. 1. E. STROPHULUS.

Gum Rash.

CLASS VI. ECCRITICA.

ORD. III. ACROTICA.

GEN. III. EXORMIA.

SPEC. 2. E. LICHEN.

Lichenous Rash.

3. PRURIGO.

Pruriginous Rash.

4. MILIUM.

Millet Rash.

IV. LEPIDOSIS.

SCALE SKIN.

SPEC. 1. L. PITYRIASIS.

Dandriff.

2. LEPRIASIS.

Leprosy.

3. PSORIASIS.

Dry Scall.

4. ICHTHYIASIS.

Fish Skin.

V. ECPHLYSIS.

BLAINS.

SPEC. 1. E. POMPHOLYX.

Water-blebs.

2. HERPES.*

Tetter.

3. RHYPHA.

Sordid Blain.

4. ECZEMA.

Heat Eruption.

VI. ECPYESIS.

HUMID SCALL.

SPEC. 1. E. IMPETIGO.

Running Scall.

2. PORRIGO.†

Scabby Scall.

3. ECTHYMA.

Papulous Scall.

4. SCABIES.

Itch.

VII. MALIS.

CUTANEOUS VERMINATION.

SPEC. 1. M. PEDICULI.

Lousiness.

* γ Shingles. δ Ringworm.

† β Scalled head.

CLASS VI. ECCRITICA.

ORD. III. ACROTICA.

GEN. VII. MALIS.

SPEC. 2. M. PULICIS.
Flea-bites.

3. ACARI.
Tick-bite.

4. FILARIE.
Guinea Worm.

5. ŒSTRI.
Gad-fly Bite.

6. GORDII.
Hair Worm.

VIII. ECPHYMA.

CUTANEOUS EXCRESCENCE

SPEC. 1. E. CARUNCULA.
Caruncle.

2. VERRUCA.
Wart.

3. CLAVUS.
Corn.

4. CALLUS.
Callus.

IX. TRICHOSIS.

MORBID HAIR.

SPEC. 1. T. SETOSA.
Bristly Hair.

2. PLICA.
Matted Hair.

3. HIRSUTIES.
Extraneous Hair.

4. DISTRIX.
Forky Hair.

5. POLIOSIS.
Gray Hairs.

6. ATHRIX.
Baldness.

7. AREA.
Areated Hair.

8. DECOLOR.
Miscoloured Hair.

9. SENSITIVA.
Sensitive Hair.

X. EPICHRYSIS.

MACULAR SKIN.

SPEC. 1. E. LEUCASMUS.
Veal Skin.

CLASS VI. ECCRITICA.

ORD. III. ACROTICA.

GEN. X. EPICHROSIS.

SPEC. 2. E. SPILUS.

Mole.

3. LENTICULA.

Freckles.

4. EPHELIS.

Sunburn.

5. AURIGO.

Orange Skin.

6. PÆCILIA.

Piebald Skin.

7. ALPHOSIS.

Albino Skin.

CLASS I.

CLASS I.

CŒLIACA.

DISEASES OF THE DIGESTIVE FUNCTION.

ORDER I.

ENTERICA.

DISEASES AFFECTING THE ALIMENTARY CANAL.

II.

SPLANCHNICA.

DISEASES AFFECTING THE COLLATITIOUS VISCERA.

CLASS I.

PHYSIOLOGICAL PROEM.

ACCORDING to the physiological arrangement proposed in this work, the first class of diseases consists of those which primarily affect, or commence in, the digestive organs, and impede the digestive function. I say *primarily* affect these organs, because they may be affected in a secondary manner, by sympathy or induction, in consequence of diseases which originate elsewhere, and, on this account, do not belong to the present class.

General character of the diseases of the class.

Now, in order to obtain a clear idea of the nature of the diseases before us, it is necessary to have a distinct knowledge of the organs which are the seat of them, and of the function which they embrace. To follow up this enquiry into a very minute detail, is the joint province of anatomy, physiology, and animal chemistry; and a finished practitioner must derive his information from these three sources collectively, pursued through an extent of many volumes. But, for our immediate purpose, it may be sufficient to give a general view of the subject.

Digestive organs.

No animal function displays a greater diversity of means for its performance, than that of digestion; and, perhaps, the only point, in which animals of all classes agree upon this subject, is in the possession of an internal canal or cavity, of some kind or other, into which the food is introduced, and prepared for nutrition: an agreement, regarded as one of the leading features, by which the animal structure is distinguished from the vegetable.

Digestive function.

[Some form of an alimentary cavity is, perhaps, the best criterion of an animal hitherto suggested. Cuvier distinctly states, that he knows of no animal unprovided with such an organ.* On the other hand, plants do not contain any large, separate, internal cavity for the reception of their nourishment, which they absorb by pores on their surface, and especially by their roots and leaves. As the generality of animals possess the power of locomotion, they could not have roots, by which they would be fixed in one situation. Most of them take their supply of food at once, according to need and opportunity, carry it about with them, and digest it at their leisure. This object is fulfilled by an alimentary cavity, whose internal pores, for imbibing the nutriment, may be compared to vegetable roots, which take up food from the soil. Hence Boërhaave used to say, that animals have roots within them; and the villi of the small intestines, as furnishing the general frame with the nutriment applied to their absorbent mouths, are beautifully denominated by Béclard the radicles of animal life. A distinct alimentary cavity, generally having a reference to locomotion, is then, as

Alimentary cavity in every animal.

* Dict. des Sciences Méd., tom. ii. p. 145.

Cuvier remarks, one of the most invariable characters of an animal. A single mouth, he says, which some naturalists have fixed upon as a criterion, and contrasted with the multiplicity of the pores of the roots of vegetables, is less constant; for some animals of the family of medusa have several mouths, yet only one common stomachic cavity.

The superior relative importance of the digestive organs in the animal economy is further illustrated by the fact, that the existence of parts of them may be traced in the early stages of the fœtus, long before any rudiment of the spinal marrow, brain, or heart, can be detected. In this instance we also find the principle confirmed, that parts, first formed, are most rarely wanting. Thus, monsters have been met with, which consisted of nothing more than an abdomen, more or less perfect; but, the separate developement of a head, or chest, has never been observed. Man may be so incompletely developed, as to approach the point constituting the full organisation of certain lower animals, and to appear only as a mere digestive cavity. But, simple as his organisation may be, the zoophyte, which exhibits a like simplicity, can live and reproduce itself, such organisation being natural to it; but man must perish; for his existence, as a mere unfinished sketch of himself, would be a contravention of the laws of nature.*]

In man.

The alimentary cavity in man extends from the mouth through the whole range of the intestinal canal; and hence, its different parts are of very different diameters. In the mouth, where it commences, and in the pharynx, it is comparatively wide; it contracts in the œsophagus; then again widens to form the stomach, and afterwards contracts again into the tube of the intestines. The intestinal tube itself is also of various diameters, in different parts of its extent; and it is chiefly on this diversity of magnitude that anatomists have established its divisions. Its general length is five or six times that of the man himself; and, in children not less than ten or twelve times; [digestion in them being particularly active, from the greater supplies of nutriment required for growth and reparation. Meckel found the length of the small intestines very irregular in different persons, and that it varied from thirteen to twenty-seven feet, without any proportional difference in the stature of the body. In some animals, the intestinal canal is imperforate, the dross of the food being rejected by the mouth. This was once supposed to be the case in the medicinal leech: but Cuvier, Blumenbach, and Carus all agree, in opposition to Dumeril, that the leech has a minute anus, from which, however, only a little fecal matter is discharged, most of it being voided by the month. No anus has yet been satisfactorily detected in the tape-worm.† In the actiniæ, one aperture combines the two offices of mouth and anus.‡]

In some animals imperforate.

In the human subject, the anus is sometimes imperforate at birth, with a preternatural outlet, formed in some neighbouring part or organ to supply its place, in which case the feces have been discharged by the urethra, the vagina, the navel, or the groin. An extraordinary instance of such accommodation is that of a girl, who from birth was imperforate in the anus and meatus urinarius;

* Andral, *Anat. Pathol.*, t. ii. p. 131. The stomach is formed subsequently to the intestines, and more frequently wanting.

† Carus's *Comp. Anat.*, vol. ii. p. 15.

‡ *Ibid.* p. 3.

in fact, in the whole division of the vulva; and who, to the age of fourteen, had regularly discharged her urine by the breasts, and her feces by a natural vomiting or rejection from the stomach.*

Generally speaking, the extent of the digestive cavity bears a relation to the nature of the aliments by which the individual is designed to be nourished. The less analogous these aliments are to the substance of the animal they are to recruit, the longer they must remain in the body, to undergo the changes that are to assimilate them. Hence, the intestinal tube of herbivorous animals is for the most part (for we still meet with exceptions) very long; or, in particular portions, exceedingly capacious; in various kinds remarkably complicated, and often double or triple. Thus, in the horse, the large-intestines are of enormous size, and dilated into sacculi, while the cœcum is as capacious as the stomach. In the ruminant animals, besides the peculiar complexity of the stomach, the alimentary canal is twenty-seven times the length of the body. On the contrary, carnivorous animals have a short and straight canal; their food being already of their own nature, containing a larger quantity of nourishment in less bulk, and hence demanding a smaller proportion of time and space to become fit for use. [In them every circumstance concurs to accelerate the passage of the alimentary matter. It undergoes no mastication; it is retained but a short time in the stomach; the intestine has no folds, nor valves; its diameter is small; and the whole canal, when compared to the body, is extremely short, being only as three or five to one. Whales, however, have a longer canal, than other carnivorous mammalia, their stomach is complicated, and the intestine has longitudinal folds. Indeed, carnivorous mammalia, of aquatic habits, generally possess a considerable length of intestine; a point, in which they differ from most other animals of that class. The shortness of the intestinal canal in the generality of fishes, is compensated by the length of time the food, which is usually animal, is detained in it. A perch has been observed to take food but once in ten days, or a fortnight.†

Relative extent of the alimentary cavity.

In omnivorous animals, the canal is not so long as it is in the herbivorous, nor so short as it is in the carnivorous. Thus, in the rat, its proportion to the body is as eight to one; in the pig, thirteen to one; and in man, six or seven to one. In him the diminution in length is compensated by the numerous valvulæ conniventes and the preparation of the food by cookery.‡ The domestic cat, which eats bread as well as flesh, has an alimentary canal considerably longer, than that of the wild cat.]

The digestive canal of man is less capacious and complex, than that of most mammalia, which take only vegetable food; yet, larger and more complicated, than that of other mammalia, which live entirely on flesh. Hence, man seems to be capable of subsisting either on animal or vegetable food; and, from the nature of his digestive as well as of various other organs, is better qualified for every diversity of aliment and climate than any other animal. Thus, many nations in a savage state live almost, perhaps altogether, on fruits and roots; as those of the yam, beet, and

Omnivorous power of human stomach.

* Samml. Med. Wahrnehm., b. viii. p. 29.

† Home's Lectures on Comparative Anat., p. 340.

‡ Blumenbach's Comp. Anat., p. 178.

potato, the bread-fruit-tree, bread-nut (*brosimum alicastrum*), sweet-chestnut, banana, cabbage-tree, palm (*areca oleracea*), and meal-bark (*cyacas circinalis*). Others live on raw animal flesh, or flesh of the coarsest kind, as that of one species at least of the walrus (*trichecus dudong*), the sea-bear, and sea-calf. The Greenlander feeds voraciously on the skin and fins of the nord-capon, and on the flesh of whales. Many African tribes are said to live on dead lions and hippopotami. Dogs are eaten in the South Sea islands, horses in Tartary, and cats in many parts as a substitute for rabbits. Among numerous tribes of savages, indeed, the flesh of man himself is still dressed for food: the custom may have been more extensive formerly than in the present day; but it still prevails in several of the Australasian isles, and is even exhibited in New Zealand, where the inhabitants are nevertheless peculiarly intelligent, and disposed to adopt the manners of Europeans. The Hindus subsist chiefly on rice and maize, and will not touch flesh of any kind. Many tribes of wandering or nomadic Moors on gums, principally gum seneca. The Kamtschadales, and the wretched inhabitants of the neighbouring shores, on fishes, or coarse fish-oil mixed into a paste with saw-dust, or the rasped fibres of indigenous plants: while the more polished and luxurious nations of Europe live on solid and liquid foods of every description. Yet, it should not be forgotten that, in Ireland and some other places, the only aliment subsisted upon in extensive and populous communities, whose poverty prevents them from obtaining any other, is the potato.

Man, therefore, is omnivorous; but he is not the only omnivorous animal in the world: for the great Author of nature is perpetually showing us that, though he operates by general principles, he is in every instance the lord, and not the slave, of his own laws. And hence, among quadrupeds, the swine, and, among insects, the ant (and more examples might be adduced if necessary), possess as omnivorous a power as man himself, and feed equally on the fleshy parts of animals, and on grain, and the sweet juices of plants. [In this respect, there is a power of accommodation, where it would not *à priori* be expected. Thus, certain animals which, from the structure of their digestive organs, are plainly designed to live entirely either on vegetable or animal food, will subsist, as a matter of necessity, altogether on the particular kind not intended for them by nature, especially when the change is made in a gradual manner. Thus, in the northern parts of Asia, where grain is scarce, horses and oxen are sometimes fed on fish.* Spallanzani habituated an eagle to live on bread, and a pigeon on flesh.† If fresh-water mollusca are put at once into sea water, or sea-water mollusca into fresh water, they perish; but, if the change be gradually made, they live very well.‡]

It is sometimes suspected, that no animal can derive nutriment from any material not containing a proportion of azote, one of the essential elements of the animal body, and existing in it far more

Power of
animals to
derive
nutriment
from food
not natural
to them.

Whether
azote be
necessary
to animal
nutriment.

* See Home's Lect. on Comp. Anat.

† Expériences sur la Digestion, c. 74. et 75.

‡ Ann. de Chimie, &c. vol. ii. p. 32. and Blumenbach's Physiology, 4th edit. p. 309. Sometimes a long deviation from the natural food is followed by a change in the structure of the digestive organs: thus, after a sea-gull has lived for some time upon grain, the strength of its gizzard is increased. See Home, Comp. Anat., vol. i. p. 354.

largely than in plants. [This doctrine, however, must be incorrect, if spiders can live on sulphate of zinc*, and the Otomacs eat little else some months in the year, than large quantities of earth. A sudden change from a diet of fully azotized substances, like meat, bread, &c., to one composed of vegetables containing little or no azote, certainly cannot always be borne by the human constitution with impunity. This was proved in the eastern part of France, in the year 1817, where the failure of the crops produced such a famine, that the poor were compelled to contend, as it were, with the beasts of the field for whatever vegetable productions could be found. The consequences were general anasarca, interruption of the menses, a diminution of the ordinary number of conceptions by one half, as carefully estimated by parochial documents, and permanent injury of the health. Even the sudden return to the use of barley bread, after the continuance of this miserable regimen for three months, was found not to be unattended with peril.†]

It has often been a question, whether the abundance of azote in animals is derived from the atmosphere, by respiration or absorption, or by both these processes; or whether it is produced by the action of life itself; or obtained from articles of food.

The experiments of M. Magendie favour the supposition, that the great source of azote in the animal body is the food; for, on feeding animals of various kinds on substances that contain no sensible portion of azote, as sugar, gum, olive-oil, and butter, together with distilled water, and confining them to this kind of diet, they gradually fell into a state of atrophy, and died. The secretions assumed the character of those of herbivorous animals, the food was digested, but, the muscles were reduced to one sixth of their proper volume. It is singular, that all the animals before death exhibited an ulcer of the cornea, which sometimes spread through the membrane, and let out the humours of the eye.

[Haller observes that certain animals are destroyed by the use of sugar, although nutritious and salutary to others. In Stark's experiments, we have many examples of the indigestible nature of a diet composed of a single article, which was easily digested when mixed with other substances. In order to render M. Magendie's experiments unexceptionable, Dr. Bostock‡ thinks, that a diet should have been tried, composed of a mixture of substances destitute of nitrogen. In fact, M. Magendie himself admits, that the question is not yet settled, whether life can be long supported by the sole use of any one species of aliment, however nutritive.§ At the same time, it deserves particular notice that, in 1750, a caravan of above one thousand Abyssinians, in consequence of having consumed all their provisions, are alleged to have subsisted for two months entirely on gum-arabic, which happened to be amongst their merchandise.|| If this be true, it proves, that man can live on a single substance, which was found by Magendie to be insufficient nourishment even for dogs.]

Insufficiency of a diet consisting of only one article.

* Thomson's Annals of Philosophy, vol. xii. p. 494.

† Gaspard, in Magendie's Journ., t. i. p. 237, &c.

‡ Elem. Syst. of Physiology, vol. ii. p. 467.

§ See Physiology, transl. by Milligan, p. 222. 2d edit.

|| Hasselquist, Voyages, &c. in the Levant, p. 298.

Compara-
tive length
of the ali-
mentary
canal.

In general, the length of the alimentary canal is greater in mammalia, than in the subordinate classes. It diminishes successively in birds, amphibia, and fishes; being in some fishes even shorter than the body itself, which is never the case in the first three classes; and in insects and worms is so diversified, as almost to bid defiance to any kind of scientific arrangement; being, in many instances, short and narrow, as in the dragon-fly (*libellula*); and in others, as proper hydatids and infusory worms, constituting the globular membrane in which the entire structure of the animal consists. [On the whole, a long and complicated intestinal tube denotes, that the insect feeds on vegetables; while the contrary character indicates that its food is animal. So capricious has nature been in the lower beings that, in the animals of corals and sponges, the intestines of several individuals frequently communicate, (*e. g.* in the animals of the *pennatula*, sea-feather,) where the nutriment of all is derived from a common source.*]

Buccal
pouch.

Attached to the cheeks in some quadrupeds, as the monkey and marmot tribes, is a pouch or pocket, which conveniently holds their spare food, or enables them to convey it to their winter hoards.

Œsopha-
gus, sto-
mach, and
intestines.

The mouth communicates with the stomach by the long, narrow, membranous and muscular canal, denominated the œsophagus, or gullet. This in many animals is so dilatable, as to enable them to swallow animals more bulky than themselves. [In those carnivorous animals which swallow voraciously, as the wolf, it is very large; but, in many herbivorous ones, of considerable size, and particularly such as ruminant, its muscular fibres are proportionably stronger, and capable of voluntary motion. The process of rumination implies a power of voluntary motion in the œsophagus; and indeed the influence of the will throughout the whole operation is incontestable. It is not confined to any particular time; since the animal can delay it, according to circumstances, when the paunch is quite full. In the occasional examples of the power of rumination in man, the operation is also found to be voluntary. The opening of the œsophagus into the stomach is marked by some differences, both with regard to its size and mode of termination: circumstances explaining why some animals, as the dog, easily vomit; while others, as the horse, are scarcely susceptible of this operation†, which, in the latter, is also partly hindered from taking place through the mouth by the complete manner, in which this cavity admits of being separated from the gullet by the velum palati.]

Rumina-
tion.

We have not time to follow up these playful diversities of nature; and must confine ourselves to a brief glance at the general structure of the human stomach, to which the œsophagus conducts. This is situated on the left side of the diaphragm or midriff: in its figure it resembles the pouch of a bagpipe; its left end is most capacious; its upper side is concave, and its lower convex; the two orifices for receiving and discharging the food are situated in the upper

* See Carus's Comp. Anat., vol. i. p. 14.

† Blumenbach's Comp. Anat., pp. 82—87. 2d edit. When a horse is compelled to vomit, he makes such efforts with the abdominal muscles, that the pressure on the distended stomach sometimes bursts it, the rupture always taking place towards its great curvature. See Andral, Anat. Pathol., t. ii. p. 107.—EDITOR.

part. In its substance it consists of three principal coats or layers, the external and internal of which are membranous, and the middle muscular. The internal coat, moreover, is lined with a villous or downy apparatus, and is extremely convoluted or wrinkled; the wrinkles increasing in size as the diameter of the stomach contracts. [Few parts are more largely supplied with blood-vessels than the stomach, and it not only partakes of the ganglionic nerves with the neighbouring viscera, but it likewise derives another supply of nerves from the spinal cord, and is distinguished from every other part, except the organs of sense, by having a pair of cerebral nerves almost entirely devoted to it, though it is situated at so great a distance from the brain.*] In an adult it will commonly contain three pints, or rather more; [and, according to Soemmerring, when it is moderately distended, it will hold from five to eleven pints. In opening some carnivorous animals directly after death, a middle muscular constriction is noticed, dividing the organ imperfectly into two compartments. Sir Everard Home deems a similar constriction natural to the human subject, and dwells much upon it in his theory of digestion. Soemmerring† occasionally noticed it in females, in whom he supposed it to be caused by the pressure of the central bone of their stays. According to Andral‡, it is mostly the result of a change of texture, or of a contraction of the muscular coat, and sometimes a congenital imperfection. He conceives, that it indicates in man the first degree of tendency to the kind of division of the stomach distinctly manifested in some other animals. If, however, in him the stomach naturally consists but of a single cavity, without any constriction, or partition, a division of that organ is not the less evinced in him by other circumstances. Thus, the structure of the mucous membrane is certainly not exactly alike in the splenic and pyloric portions of the stomach. Their functions are also quite as different, while they are still further distinguished by the relative frequency and even the nature of their alterations of texture. In some animals, the different organisation of the two portions of the stomach is manifest to the eye: thus, in the horse, all the inside of the splenic portion is lined by a thick cuticle. The stomach of the negro is rounder and shorter than that of the European; and a still more remarkable roundness exists in the stomachs of apes, as is represented in Daubenton's excellent plates.

Stomach.

Central
constriction
of the
stomach.

With respect to the muscular fibres of the human stomach, the question is frequently agitated, whether they have any share or not in rejecting the contents of that viscus in the act of vomiting? M. Chirac gave a dog some corrosive sublimate on a piece of bread, which was almost immediately vomited up, though a violent retching afterwards continued. In this state of things, the animal's abdomen was opened, and the peristaltic action of the stomach appeared to be so feeble, that Chirac was led to infer, that the expulsion of its contents could not be owing to it. Even when the experimenter's finger was applied to the stomach, while the retching was going on, it is said, that no contraction of this organ could be felt. § Duverney also regarded the stomach as entirely passive in

Vomiting.

* See Bostock's *Elem. Syst. of Physiology*, vol. ii. p. 443.

† *Mem. of Bavar. Acad. of Sciences*.

‡ *Anat. Pathol.* t. ii. p. 133.

§ *Hist. de l'Acad. des Sciences*, 1686.

the act of vomiting. Mr. Hunter, if he did not go so far as the latter conclusion, certainly refers the chief part of the operation to the action of muscles.* This doctrine received corroboration from the experiments of M. Magendie. Two grains of tartarised antimony, dissolved in an ounce and a half of water, were introduced into a dog's crural vein. Nausea was quickly excited. The stomach was then made to protrude through a wound in the abdomen; when the spasm of retching was plainly seen to depend upon the action of the diaphragm and abdominal muscles; the stomach itself remained free from contraction, and its contents were not discharged. After the stomach had been returned into its natural situation again, so as to be capable of being acted upon by the above muscles, vomiting took place, and at the same time that viscus was felt with the finger to be relaxed. When the *nervi vagi* were divided, vomiting was not thereby prevented from being the consequence of the introduction of the tartarised antimony into the venous system; a fact, confirming the result of some experiments made long ago by Dr. Haighton. Neither was vomiting hindered from being produced by this use of tartarised antimony, when the abdominal muscles were removed, provided the *linea alba* remained entire, between which and the diaphragm the stomach was yet subjected to the necessary compression. When the phrenic nerves were cut, and the diaphragm was left with only a supply of nervous influence from a few filaments of the eleventh and twelfth dorsal nerves, it was so weakened, that it no longer duly antagonised the abdominal muscles, and vomiting could only take place in a feeble way. Perhaps, however, the most curious experiment was that, in which M. Magendie removed the stomach, substituted for it a bladder communicating with the *œsophagus*, and then threw the solution of tartarised antimony into a vein: even under these circumstances retching came on, and the contents of the bladder were vomited up.† On the contrary, Lieutaud and Haller looked upon the stomach as the chief agent, and Sir. Charles Bell may be set down as on the same side of the question; and he adverts to a stomach in his possession, the coats of which are so thickened, that they could not be made to contract by the action of the muscular fibres, and consequently there was no vomiting.‡ Against Magendie's experiments, others are recorded by Maingault; as well as a most interesting case of malformation by Drs. Graves and Stokes§, which was attended with such a displacement of the stomach into the chest, that this viscus was entirely above the diaphragm, and beyond the reach of its contractions. Yet incessant vomiting occurred during the patient's illness; "a fact worth a

* *Animal Economy*, p. 200., 2d edit.

† *Mém. sur le Vomissement et Physiol.*, t. ii. p. 138.

‡ *Anat. of the Human Body*, vol. iv. p. 54. When we come to *limosis emesis*, however, an instance will be mentioned of incessant vomiting, though the coats of the stomach were prodigiously thickened.—*En.*

§ *Dublin Hospital Reports*, vol. v. 8vo. 1830. The mechanism of vomiting is yet a disputed point. Dr. Marshall Hall is led by his experiments to believe, that the contents of the thorax and abdomen are subjected to a sudden and almost spasmodic contraction of all the muscles of expiration, the larynx being closed, so that no air can escape from the chest. Dr. A. T. Thomson inclines to the same view, and considers vomiting as an expiratory effort, rendered abortive by the shut state of the glottis. See his *Elem. of Materia Med. &c.* vol. ii. p. 193. 8vo. Lond. 1833.

thousand experiments, and which completely decides the question, that vomiting may be produced by the action of the stomach itself, unassisted by any external compressing force." On the whole, however, from the various facts which have been made out on the present topic, and to some of which we shall advert in the chapter on *Limosis Emesis*, it may be inferred, that, in ordinary vomiting, the contraction of the stomach itself is not essential, any more than the compression of the diaphragm and abdominal muscles under extraordinary circumstances.

Nothing can be more aptly contrived for the purpose of agitating, mixing, and presenting every portion of the alimentary mass to the surface, by which certain parts are to be absorbed, than is the whole structure of the small intestines. While its muscular fibres are calculated to produce a constant undulatory vermicular motion, these are loosely lined by the absorbing membrane, whose numerous plicæ and valves form a most extensive surface, with their villi erected, and even mixed, as it were, with the semifluid alimentary matter. Then the outside of these bowels consists of a smooth and constantly lubricated surface, greatly facilitating the motion of the different convolutions upon each other.*]

Small intestines.

In the more perfect classes of animals, the division between the large and small intestines is distinctly indicated by a muscular valve, formed jointly of the coats of the colon and the ileum by a short natural intussusception of the terminating portion of the latter into the commencing portion of the former; the important use of which is to moderate the flow of the contents of the smaller intestines into the latter, and to prohibit a regurgitation of feces into the former. And hence we never meet with fecal matter in the stomach, except in cases in which this valve or sphincter has lost the whole or a considerable portion of its muscular power. In the hedgehog, and several other quadrupeds, the valve of the colon does not exist; and in a few others, as the sloth and armadillo, the cæcum is wanting. In birds, the rectum, at the termination of its canal, forms an oval or elongated pouch, called *bursa Fabricii*, from the name of its discoverer; and then expands into a cavity, which has been named cloaca, from its receiving the extremities of the ureters and genital organs and their secretions; so that the fluids from all these are discharged from one common emunctory. The same mechanism is extended to a few quadrupeds, as the *ornithorhynchus paradoxus*, and the *hystrix*: the penis of the male, and the horns of the uterus in the female being equally lodged in its interior.†

Valve of the colon.

Cloaca.

Contributory to the function of digestion, performed in the stomach and the parts of the alimentary canal immediately adjoining to it, are several organs which lie near it, and are connected with it in a peculiar manner. Of these the chief are the pancreas, the liver, the spleen, and the omentum. The two last are less constantly found in the animal kingdom than the liver, to which they are by many physiologists supposed to be subservient. They generally become more obscure or diminish in size from quadrupeds to fishes: a remark that will equally apply to the pancreas, which upon the whole disappears sooner than the spleen. It is found in the shark

Collatitious organs of digestion.

* See Bright's *Gulstonian Lectures*, in *Medical Gazette*, for June 1833, p. 282.

† Sir E. Home, in *Phil. Trans.*, 1802, pt. 1. and 2.

and the skate : but, in other fishes, its place seems to be occupied and supplied by the cœcal appendices and pyloric cœca.

Liver.

The largest and most important of all these organs is the liver, by which the bile is prepared, [and which, besides being supplied, like other parts of the body, with arteries, has a large quantity of venous blood constantly poured into it by the vena portæ, formed by the junction of the veins from many of the abdominal viscera, and ramifying, like an artery, in its substance. Thus, it has two sets of vessels going into it ; and it has also two sets issuing from it ; one, the vessels forming the hepatic vein ; the other, the biliary ducts, uniting together to form the hepatic duct. In addition to all this apparatus, absorbents are distributed abundantly both to the surface and to the substance of the liver, and nerves from the hepatic plexus go to every part of it. Besides all these vessels and nerves, the liver contains a granulated substance, between the different portions of which a cellular tissue is interposed.*] It is the seat of a great variety of diseases, and appears to produce a very powerful effect on the blood itself, by the removal of several of its principles, independently of its office as a digestive organ. It descends, under some modification or other, from man to the class of worms ; and, in the snail and several other gasteropodous mollusca, is comparatively very large ; but, in various kinds, is destitute of a gall-bladder, as well among quadrupeds, as birds, fishes, and worms ; though this appendage is common to all the amphibia, many of which, as the salamander, have livers of great magnitude.

Enveloping
mem-
branes.

Bichat's
division of
proper
mem-
branes.
Serous.
Mucous.

Fibrous.

Mastica-
tion.

Chyme.

All these organs co-operate in digestion, though the peculiar effect produced by several of them is still a subject of enquiry. They present to our observation a variety of curious structures, which we shall notice more at large in treating respectively of their deviations from health ; and their surface is covered by a membranous plate, or sheet, supposed by Haller to be of condensed cellular membrane. Bichat has divided the proper membranes of the animal frame into three kinds ; serous, mucous, and fibrous. The first forms a common external coating for the viscera, whether substantial or hollow : it is possessed of few nerves, and is lubricated by a perpetually ascending halitus. The second, or mucous membranes, form an internal coating to the larger tubes and hollow viscera, mostly connected with the skin at their extremities, as the mouth, nostrils, œsophagus and intestines, the cavities of the urinary and the uterine systems. They are enriched with numerous nerves, and their structure is loaded with minute glands, which secrete a muculent fluid, with which the interior surface of the organs is constantly moistened. The third, or fibrous division of membranes, belongs to another set of organs, and consists of the dura mater, which lines the skull, the periosteum, the membranous expansions of the muscles, the capsules of the joints, and the sheaths of the tendons.

The solid materials of the food are usually first masticated and moistened in the mouth and fauces, and in this state are introduced into the stomach, where they are converted into a homogeneous pulp or paste, which is called chyme : they are then in this pul-
taceous form introduced into the duodenum, and, by an additional operation, transmuted into a fluid, often presenting a milky appear-

* Bright, Op. cit.

ance, and denominated chyle; in which state they are absorbed or drunk up by thousands and tens of thousands of little mouths of very minute vessels, which are sparingly if at all found in the stomach, but which abound upon the interior surface of the small intestines into which the stomach empties itself. These vessels constitute a distinct part of the lymphatic system. From the frequently milky appearance of their contents, they are known by the name of lacteals; [but, as the chyle is not always white, perhaps a better name for them is chyliferous vessels.] They anastomose, or unite together gradually, and at length terminate in one or two common trunks, the chief of which is termed the thoracic duct, whose office is to convey the different streams thus collected from the alimentary canal, as well as from other parts of the body, to the sanguiferous system, to be still farther operated upon by the action of the heart and lungs.

Lacteals.

[The saliva, or spittle, the fluid, with which the food is first blended in the mouth, is secreted by the salivary glands. According to Berzelius, its solid contents do not exceed seven in 1000 parts, the rest being water. The principal saline ingredient in it appears, from Tiedemann and Gmelin's analysis, to be muriate of potash; but the sulphate, phosphate, acetate, carbonate, and sulphocyanate of potash are likewise present in small quantity. The human saliva contains but little soda. All physiologists, in their account of the uses of the saliva, represent it as lubricating the aliment preparatory to deglutition; as bringing sapid bodies under the influence of the organ of taste; and as softening the food for digestion.

Saliva.

In the above sketch of digestion, the function of the lacteals or chyliferous vessels has been cursorily noticed. It must now be mentioned, that modern physiologists disagree about the extent of the office and power of these vessels. Thus, M. Magendie's experiments lead him to doubt, in opposition to the statements of Hunter, whether they ever absorb any thing but chyle; and it is one of his doctrines, that all other substances, and particularly drinks, are conveyed from the alimentary canal into the circulation by the veins. It is the villi of the intestines, he observes, formed in part by the origins of the veins, which absorb all the liquids in the small intestines, except the chyle. From the commencement of absorption until its conclusion, the properties of those liquids are discoverable in the blood of the branches of the vena portæ, but not in the lymph, or chyle, till long after absorption has begun. Magendie's experiments also tend to prove, that they then reach the thoracic duct, not through the chyliferous vessels, but by the communication of the arteries with the lymphatics. The vena portæ, which is the trunk of all the veins of the digestive organs, divides and subdivides in the tissue of the liver. Now, certain other experiments, of which M. Magendie gives the particulars, induce him to conclude, that this arrangement in the human economy has the effect of mixing the matter, absorbed in the intestinal canal by the veins, intimately with the blood; and that, if large quantities of drink and other substances, not chyle, were to be at once transmitted to the source of the circulation by the thoracic duct, without having undergone a preliminary change in

Whether
lacteals ab-
sorb any
thing but
chyle.

the liver, serious and fatal consequences would arise. The facts, on which this reasoning is founded, are highly interesting.

Sir Everard Home formerly entertained a particular theory, that fluids passed from the stomach directly into the spleen. Though his observations disagree very much with those of Magendie, they corroborate one point maintained by the latter physiologist; namely, that fluids pass from the alimentary canal into the circulation by some other channel, than that of the chyloferous vessels. Strong arguments against Sir Everard Home's particular theory are deducible from the fact, that, if it were true, animals certainly could not exist, or even enjoy good health, without a spleen. Sometimes the spleen is wanting in man*; and sometimes it has been removed from animals, which recovered and lived very well.† The hypothesis also appears to be scarcely consistent with what happens in the horse, whose stomach, which is small in proportion to the size of the animal, could not contain the immense quantity of hay, grass, oats, and water, often consumed in a very short time; and from which organ, as was stated by Mr. Green, in his lectures at the College of Surgeons, in 1828, Professor Coleman had ascertained by experiments, that the passage of drink along the intestines was sometimes equal to the rate of ten feet in a minute.]

Chymification.

The means by which the food is broken down into pulp, after being received into the stomach, are various. In the first place, the muscular tunic of the stomach acts upon it by a slight contraction of its fibres; and, in connection with a certain degree of pressure, derived from the surrounding organs, produces, so far as this cause operates, a mechanical resolution. Secondly, the high temperature in the stomach produces a concoctive resolution. And, thirdly, the stomach itself secretes and pours forth from the mouths of its minute arteries a very powerful solvent, which is by far the chief agent in the process, and thus effects a chemical resolution. In this manner, the moistened and masticated food is converted into chyme. It then passes into the duodenum, and becomes mixed with the secretions poured into this organ from the pancreas, the liver, and the duodenum itself, and subject to their action; and hence its conversion into chyle.

Chylification.

The whole process of digestion, therefore, as it occurs in the human body, to which the description now given chiefly applies, consists of three acts; mastication or chewing, chymification, and chylification.

Indigestible substances.

Many substances are so hard and intractable as to sustain the action of the digestive organs without any other change, than that of being softened or otherwise partially affected, instead of being entirely subacted, and reduced to chyme or chyle. Such especially are the seeds of plants: and it is well worth observing, that, while birds or other animals derive from this kind of food a valuable nutriment, notwithstanding its passing through them without being completely digested, the seeds themselves, that are thus acted upon, derive also a reciprocal benefit in many instances; and are hereby rendered more easily capable of expanding in the soil, into which they are afterwards thrown as by accident, and have their

* Lieutaud, tom. i. p. 234.

† Th. Bartholini Anat., p. 155. Lugd. Bat. 1686. Mayo's Outlines of Physiology, p. 142.

productive power very greatly increased.* The olive-tree has till of late years only been raised in the south of France by cuttings, or wild plants obtained from the woods. It was remarked by an attentive inhabitant of Marseilles that, when produced naturally, it is by means of kernels carried into the woods, and sown there by birds which had swallowed the olives. By the act of digestion, he further observed, these olives are deprived of their natural oil, and the kernels hence become permeable to the moisture of the earth; the dung of the bird at the same time serving for manure, and perhaps the soda which the dung contains, by combining with a portion of the oil that has escaped digestion, still further favouring germination. Following up this fact, a number of turkeys were made by the experimenter to swallow ripe olives; the dung was collected, containing the swallowed kernels; the whole was placed in a stratum of earth, and frequently watered. The kernels thus treated vegetated easily, and a number of young plants were procured. And in order to produce upon olives an effect similar to that experienced from the digestive power of the stomach, a quantity of them were afterwards macerated in an alkaline lixivium; they were then sown, and proved highly productive.

Singular mode of rearing olives.

Most of the plants found on coral islands, and in various other places, are propagated by the same means of passing through the digestive canal; and it is probable, that the seeds of many of them are equally assisted by the same process. And even when they are completely disorganised and digested, the material to which their refuse is converted, and which, combined with the animal secretions that accompany it, is called dung, very powerfully contributes, as every one knows, to render the soil productive. So that, by the wisdom of Providence, animal digestion and vegetable fructification are equally dependent on each other, and are alternately causes and effects.

Vegetation promoted by animal dejections.

Considering the comparatively slender texture of the chief digesting organ, and the toughness and solidity of the substances it overcomes, it cannot appear surprising that mankind should, at different times, have run into a variety of mistaken theories in accounting for its mode of action. Empedocles and Hippocrates supposed the food to become softened by a kind of putrefaction. Galen, whose doctrine descended to recent times, and was zealously supported by Grew and Santarelli, ascribed the effect to concoction, produced, like the ripening and softening of fruits beneath a summer sun, by the high temperature of the stomach. Pringle and Macbride advocated the doctrine of fermentation; thus uniting the two causes of heat and putrefaction assigned by the Greek writers: while Borelli, Keil, and Pitcairn resolved the entire process into mechanical action, or trituration; thus making the muscular coating of the stomach an enormous millstone, which Dr. Pitcairn was extravagant enough to conceive ground down the food with a pressure equal to a weight of not less than a hundred

Early hypotheses concerning the digestive power.

* In many birds, the pylorus is close to the orifice of the stomach, and has no valve, so that the seeds of plants, which have been swallowed, readily pass into the intestinal canal. This arrangement must have an important effect in promoting their diffusion. Their disposition to vegetate more quickly after having thus pervaded the alimentary tube, is a fact, that was particularly noticed by the late Sir Joseph Banks. — Ed.

and seventeen thousand pounds, assisted at the same time in its gigantic labour by an equal pressure derived from the surrounding muscles.

Their
futility.

Each of these hypotheses, however, being encumbered with insuperable objections, Boërhaave endeavoured to give them force by interunion, and hence united the mechanical theory of pressure with the chemical theory of concoction; while Haller contended for the process of maceration. Still a something else was wanting, and continued to be so, till Cheselden, in lucky hour, threw out the hint (for at first it was nothing more than a hint) of a menstruum secreted in some part of the digestive system; a hint, which was soon eagerly laid hold of, and successfully followed up, by Haller, Reaumur, Spallanzani, and other celebrated physiologists. Although Cheselden was mistaken in the peculiar fluid to which he ascribed the solvent energy, namely, the saliva, still he led forward to the important fact; and the gastric juice was soon afterwards clearly detected, and its power incontrovertibly established.

Discovery
of the gas-
tric juice.

Digestive
organs of
birds.

[The doctrine of digestion by trituration, or mechanical principles, was founded in a great measure upon an imperfect acquaintance with the digestive organs of birds. Although birds are not furnished with teeth, many of them feed upon hard substances, which, if they were unbroken, the gastric juice could not dissolve. Hence they are furnished with a crop, which is a large membranous cavity at the lower end of the gullet, for the reception of the food when it is first swallowed, and where it is softened by the secreted fluids of the part. They are also provided with a gizzard, into which the food, after being macerated in the crop, is transmitted. The gizzard is a cavity of a moderate size, and flattish spherical form, composed of four strong muscles. Two of these, which constitute the greatest part of its bulk, are of an hemispherical shape, of a dense and firm texture, and lined with a thick callous membrane. The effect of their action is to move them laterally and obliquely upon each other, so that whatever is placed between them is subjected to a very powerful combination of friction and pressure. The force is such, indeed, as not only to break down the hardest grains, and reduce them to a complete pulp, but even to grind to powder pieces of glass, and to act upon siliceous pebbles and masses of metal, while the cuticular lining is so tough as not to be injured by the presence of lancets or other sharp instruments, which have been introduced into the cavity by accident, or for the sake of experiment. However, the action both of the crop and the gizzard must be considered as essentially mechanical, the latter being equivalent to the teeth, and the former serving merely for the purpose of maceration. A strict connection is always remarked between the food of birds and the nature of their stomachs; those alone possessing the gizzard which swallow substances that the gastric juice could not dissolve in the entire state. Many writers, in describing the muscular stomachs of granivorous birds, speak of the gizzard as analogous to the digesting stomach of man or of non-ruminant quadrupeds, whereas it is only a substitute for the organs of mastication. Spallanzani proved, however, that the triturated substance in the gizzard is acted upon by the gastric juice, which is furnished by a glandular apparatus, the

bulbus glandulosus, situated at the lower end of the gullet; the structure of the gizzard being evidently not adapted to its secretion. In birds, therefore, digestion is produced by a powerful solvent, just as it is in the human subject.]

The gastric juice, this wonderful menstruum, the most active we are acquainted with in nature, is secreted, as I have already observed, by the capillary arteries that infinitesimally intersect the cellular texture of the stomach, and decussate each other in their ramifications. The quantity secreted during digestion is considerable: Leuret and Lassaigne found, that when the gullet of a horse was tied, so as to prevent the secretions of the mouth and gullet from entering the stomach, a full meal of oats became completely saturated with gastric juice in four or five hours. Mr. Cruickshank supposes the quantity of the fluid, thus secreted, to be about a pound in every twenty-four hours. Yet the quantity seems to vary considerably, according to the demand of the system, or the state of the stomach itself. In carnivorous birds, whose stomachs are called membranous from having little muscularity, and, consequently, whose food is turned into chyme principally by the action of the gastric juice, without any collateral assistance or previous mastication, this fluid is secreted in a much larger abundance; as it is also in those who labour under that morbid state of the stomach which is called canine appetite, and will be distinguished in the present classification by the name of *limosis avens*; as likewise when, on recovery from a fever, or after long abstinence, the system is reduced to a state of great exhaustion, and a keen sense of hunger induces a desire to devour food voraciously and almost perpetually.

[If the contents of the stomach be examined after a long fast, and without any stimulus being applied to its villous membrane, the fluid found in it is a clear, ropy, rather opaque liquid, nearly or quite destitute of acidity. But if any stimulus, even of the simplest kind, be applied to the inside of the stomach, then the fluid secreted is uniformly acid. Hence, during digestion, it is found to be distinctly acid; indeed, free muriatic acid was detected during this process by Dr. Prout in the stomach of the rabbit, hare, horse, calf, and dog (Phil. Trans. 1824); and also in the matter ejected from the stomach of persons labouring under indigestion. Tiedemann and Gmelin obtained the purest gastric juice by making animals swallow quartz pebbles after a long fast, and killing them an hour afterwards. It was generally greyish-white, ropy, and decidedly acid. When taken from the dog and the horse, it contained some mucus, osmazome, and salivary matter, alkaline sulphates, and hydrochlorates, the alkali being chiefly soda, besides phosphate and muriate of lime, with other salts in minute proportion; and the acidity was owing to the hydrochloric and acetic acids in the dog, and to these conjoined with the butyric acid in the horse. As the lactic acid of Leuret and Lassaigne is now acknowledged by Berzelius to be a variety of the acetic, all parties may be regarded as agreeing about the presence of that acid in the gastric juice. The researches of Prout, Children, and Graves, confirmed as they have been so amply by Tiedemann and Gmelin, also fully establish the presence of free muriatic acid. When the secretion of the gastric juice is elicited by its natural stimulus, food of various kinds,

Quantity
of the gas-
tric juice.

Qualities
of the gas-
tric juice.

the chymous mass is invariably acid ; and Tiedemann and Gmelin further maintain, as the result of their experiments, that its acidity is greatest when the food is most difficult of digestion. In dogs and cats, the greatest acidity was remarked when they were fed with coagulated albumen, fibrin, bones, or gristle ; it was less when they took starch, gelatin, potatoes, or rice ; and when they were fed with liquid albumen, the alkaline quality of the food was nearly sufficient to neutralise the acidity of the gastric juice.]

This singular secretion has the peculiar property of coagulating milk, as well as all albuminous substances, which it also as completely dissolves ; and hence the milk thrown up from the stomach of an infant, shortly after it has been swallowed, is always found in a curdled state. [By infusing six or seven grains of the inner coat of the stomach in water, a liquor is produced, which, according to Dr. Fordyce, will coagulate 100 ounces of milk ; or, according to Dr. Young, of Edinburgh, 6857 times its weight of milk.] But, the two grand and characteristic properties of the gastric juice, are its astonishing power of counteracting and correcting putrefaction, and of dissolving the toughest and most rigid substances in nature.

Antiseptic
power of
the gastric
juice.

Of its antiseptic power, abundant proofs may be adduced from every class of animals. Among mankind, and especially in civilised life, the food is usually eaten in a state of sweetness and freshness ; but fashion and the luxurious desire of having it subacted and mellowed to our hands, tempt us to keep several kinds, as game and venison for example, as long as we can endure the smell. The wandering hordes of gipsies, however, and the inhabitants of various savage countries, and especially those about the mouth of the Orange River in Africa, carry this sort of luxury to a much higher pitch ; for they seem to regard a feter as a perfume, and value their food in proportion as it approaches putrefaction.

Now, all these foods, whatever be the degree of their putridity, are equally restored to a state of sweetness by the action of the gastric juice, a short time after they have been introduced into the stomach. Dr. Fordyce made a variety of experiments in reference to this subject upon the dog, and found in every instance, that the most putrid meat it could be made to swallow was in a very short period deprived of its putrescency. We cannot, therefore, be surprised that crows, vultures, and hyenas, which find a pleasure in tainted flesh, should fatten upon so impure a diet ; nor that the dunghill should have its courtiers, among insects, as well as the flower-garden.

The gastric juice has hence been employed as an antiseptic in a variety of cases out of the body. Spallanzani ascertained, that the gastric juice of the crow and the dog will preserve veal and mutton perfectly sweet, and without loss of weight, thirty-seven days in winter ; whilst the same meats, immersed in water, emit a fetid smell as early as the seventh day, and by the thirtieth are resolved into a state of most offensive putridity.

Gastric
juice em-
ployed me-
dicinally.

Physicians and surgeons have, in like manner, availed themselves of this corrective quality ; and occasionally employed the gastric juice of various animals, internally, in cases of indigestion from a debilitated stomach ; and externally, as a check to gangrene, and a stimulus to indolent ulcers.

Solvent
power of
the gastric
juice.

Yet, the gastric juice is as remarkable for its solvent, as for its antiputrescent property. Of this any industrious observer may satisfy himself by attending to the economy of digestion in many of our most common animals. But it has been strikingly exemplified in the experiments of Reaumur, Spallanzani, and Stevens.* Pieces of the toughest meats, and of the hardest bones, enclosed in small perforated tin cases, to guard against all muscular action, were repeatedly, by the two former of these physiologists, thrust into the stomach of a buzzard. The meats were uniformly found diminished to three-fourths of their bulk in the space of twenty-four hours, and reduced to slender threads; and the bones were wholly digested either upon the first trial, or a few repetitions of it. The gastric juice of a dog dissolves ivory and the enamel of the teeth; that of a hen has been found to dissolve an onyx, and diminish a louis-d'or. And it is not many years ago, that the handles of several clasp-knives were found half-digested, and the blades blunted, in the stomach and intestines of a man, who had some time before swallowed these substances out of hardihood, and at last died in one of the hospitals of this metropolis. [The experiments of Leuret, Lassaigne, Tiedemann, and Gmelin, all confirm the statements of Spallanzani, Stevens, Gosse, and others, and contradict those of Montègre, who supposed that the gastric juice did not act out of the body. Leuret and Lassaigne remarked, that the fluid procured by long sponges from the stomach of a duck while fasting, when kept upon bread crumbs, at a temperature of 88 degrees Fahrenheit, soon divided them into minute particles, and formed with them a homogeneous mass, precisely like chyme; and that, when flesh was mixed with the gastric juice of a dog, it was quickly softened and deprived of weight. The observations of Tiedemann and Gmelin are more particular. The fluid, found in the stomach of a dog, during the digestion of bones and coagulated albumen, was made the subject of experiment, and comparative observations were made with water and with milk. Various kinds of food were tried, such as bread, coagulated albumen, raw flesh, and boiled flesh; and in every instance it was observed, that the bread was broken down, in the course of eight or ten hours, into a pap, and the surface of the beef and albumen was converted into a pulp, which could be easily scraped off. Montègre is supposed to have failed in procuring similar results, because the fluid, with which he operated, was not gastric juice, secreted in consequence of the application of some stimulus to the stomach, but a mixture of saliva, the mucus of the gullet, and the kind of fluid found by Tiedemann and Gmelin in the stomach while empty and not stimulated. Yet Leuret and Lassaigne, it is to be observed, succeeded with the gastric juice of a duck, though the animal was in the fasting state. A convincing proof of the power of the gastric juice to dissolve substances out of the body, as well as of its great antiseptic property, has lately been put upon record. A lad had a fistulous opening leading into the stomach, from which the gastric juice was readily procured, by means of a hollow bougie and elastic bottle. A piece of beef, connected with a thread, was introduced

* For Dr. Stevens's experiments, which were numerous and well-conducted, see his *Dissertatio Physiologica Inauguralis*; or an analysis of it in *Edin. Med. Comment.* vol. v. p. 146.

into the stomach, and another piece was put into a phial of gastric juice, the temperature of which was 100° , the same as that within the stomach itself. The piece in the phial underwent a perfect dissolution, though more slowly than that in the stomach, probably in consequence of the latter being continually exposed to fresh gastric juice, and the peristaltic action of the stomach. Solutions of beef and chicken thus procured, remained a whole month in hot weather, free from fetor and sourness.* Tiedemann and Gmelin even attempted to accomplish, by means of the simple substances contained in the gastric juice, the same solution or digestion that is effected by this secretion itself; and they found that dilute acetic acid, dilute hydrochloric acid, a weak solution of acetate of ammonia, will severally dissolve most animal substances used as food. The experiments, however, were incomplete, because the effect of the foregoing articles, united together as they are in the gastric juice, was not tried.]

Power of
the stomach
to digest
itself.

It is in consequence of this wonderful power that the stomach is sometimes found in the extraordinary action of digesting its own self; and of exhibiting, when examined in dissection, various erosions in different parts of it, and especially about its great extremity. It was the opinion of Mr. Hunter†, however, that such a fact can never take place except in cases of sudden death, when the stomach is in full health, and the gastric secretion, now just poured forth, is surrounded by a dead organ. For he argues plausibly, that the moment the stomach begins to be diseased, it ceases to secrete this fluid, at least in a state of perfect activity; and that so long as it is itself alive, it is capable, by its living principle, of counteracting the effect of this solvent power. Yet it has been found thus eroded, in some cases, where death has followed long constitutional illness. Dr. Wilson Philip has occasionally found similar erosions in the stomachs of rabbits‡ and apparently from the cause suspected by Mr. Hunter.§

* American Medical Recorder, January 1826.

† Phil. Trans. 1772, vol. lxii. p. 447.

‡ Treatise on Indigestion, &c., p. 62. 8vo. Lond. 1824.

§ On this very curious subject, Andral has not yet made up his mind, and deems further observations necessary. (Anat. Pathol. t. ii. p. 28.) The late Dr. Armstrong also entertained some doubt respecting the correctness of Mr. Hunter's doctrine. "If," says he, "the operation of the gastric juice after death, were the cause of the dissolution of parts of the stomach, this appearance would surely be one of the most frequent in morbid anatomy; whereas it is notoriously very rare." He adds, that, in every instance that he had seen, the most unequivocal signs of disease existed for some time before death. (Morbid. Anat. of the Bowels, p. 46. 4to. Lond. 1828.) On the contrary, Mr. Hunter asserts, that there are few dead bodies, in which the great end of the stomach is not in some degree digested. (Phil. Trans. vol. lxii.) The examples seen by Dr. Armstrong himself were perforations of the stomach during life. Instead of most frequently occurring in the great, they mostly happened in the pyloric extremity of that organ; they were also generally the result of disease, indicated before death by a train of violent and rapidly fatal symptoms. The cases alluded to by Mr. Hunter are totally different, being attended during life with no symptoms of disease of the stomach, and often occurring in persons who have been suddenly killed in the midst of perfect health. In order to explain why digestion of the stomach does not take place in all animals that are killed while in full health, Adams referred to the opinions of Hunter concerning real and apparent death; and was led to conclude, that the digestion only took place when life was so completely and suddenly annihilated, that the blood remained fluid and the limbs free from stiffness. The facts adverted to by Dr. Carswell, however, sufficiently refute

Is it upon the principle laid down by Mr. Hunter, that, when the stomach is in a state of disease, it ceases to secrete a gastric juice of full vigour and activity, that we can account for the existence of exotic worms and the larvæ of insects and other animals for a considerable period of time without destruction? Thus Collini gives an example of a *lacerta aquatica*, found alive in the stomach two days after it had been swallowed.* Frogs and serpents have for a longer period of time been equally able to resist the action of the stomach; leeches, swallowed unintentionally, in a draught of muddy water, have thriven and grown to an enormous size; the eggs and larvæ of various insects, and especially of the *musca cibaria*, and even of the spider, have been hatched or perfected in the stomach or intestines, and the kernels of plum and cherry stones have germinated there.

Ability of worms, &c. to resist digestion.

Muscular action, however, to a certain extent, seems still requisite as an auxiliary in man, and even considerably more so in many animals, especially in graminivorous and granivorous birds.† I have already stated this as one cause of digestion: but M. Magendie has endeavoured to restore it to a much higher importance, than fair and unequivocal experiments justify; for he asserts that, what he calls *artificial digestion*, or that of alimentary substances mixed with the gastric juice, and exposed to the temperature of the stomach, does not succeed in reducing the food to chyme. But this, admitting the fact, would only show us the use of a living principle, and its influence upon every organ; and the operation or function of every organ; and which cannot be imitated out of the body. The assertion, however, is only advanced upon the single authority of M. Montègre, [the failure of whose experiments, as we have already noticed, is imputed by others to the fact, that the fluid with which he operated was not gastric juice, secreted in consequence of the application of some stimulus to the stomach, but a mixture of saliva with the mucus of the gullet, and the fluid

How far muscular action important.

this explanation. Certainly one of the most striking circumstances, in relation to the perforations of the stomach which happen after death, is their usual seat in the great extremity of that organ. It is in this part that fluids accumulate after death by the influence of their own gravity. Mr. Hunter also pointed out another important consideration, which is, that alterations, resembling those of the stomach, are frequently met with in other viscera, to which the contents of that organ directly extend their effects, after its own partial digestion; as the liver, diaphragm, spleen, left lung, and intestines. As my friend, Dr. Carswell observes, another equally remarkable fact, is the extension of these alterations in a direction in which a fluid alone could act or be carried, together with the total absence of all redness or other sign of inflammation, or adhesion, the formation of pus, &c. (See Edinb. Med. and Surgical Journ. October, 1830.) This paper contains an account of various interesting experiments, and an examination of all the opinions hitherto delivered on the cause of dissolutions of the stomach met with in the dead subject. The observations of Adams, A. Burns, Spallanzani, Bretonneau (Archiv. de Méd. t. xii. p. 345.), Carlisle, A. Cooper, and Carswell fully establish the truth of Hunter's views. As Dr. Carswell has set down acidity of the gastric juice, as essential to the production of the effects here treated of, it might be proper, in a repetition of his experiments, to substantiate this remark, by trying whether the neutralisation of the gastric juice with alkalies, would prevent its action on the stomach. To the living subject they are often given very freely for the express purpose of improving digestion. — EDITOR.

* Journ. de Méd. tom. li. p. 460.

† See Sir E. Home's articles, Phil. Trans. vol. xcvi. p. 357; xcvi. pp. 93. 139; c. p. 184; cxiii. p. 77.

found in the stomach while destitute of food, and not stimulated.* In the artificial imitations of the process of digestion, the churning action of the stomach, however, ought certainly to have been taken into consideration, and a substitute for it adopted.

Influence
of the par
vagus.

The influence of the par vagum on digestion is an interesting subject, that has excited considerable attention. Mr. Brodie divided these nerves on the cardia, yet the food still continued to be transformed into chyme. M. Magendie took out a portion of a rib, and divided the par vagum on the œsophagus immediately above the diaphragm: still the conversion of the food both into chyme and chyle was not interrupted. However, when the same nerves are divided in the neck, and particularly when a portion of them is removed, the formation of chyme is either very imperfect, or even quite prevented. The investigations of Dr. W. Philip, Breschet, and Edwards, prove, that galvanism applied to the stomach, after the division of the par vagum in the neck, restores the digestive process; and hence the doctrine that digestion depends upon galvanic principles. The fact, however, may only prove, that galvanism is a sufficient stimulus to the vessels of the stomach to enable them to continue for a time the secretion of the gastric juice.

Galvanism.

With respect to the power of the nervous system over digestion, a curious fact was demonstrated by the experiments of M. Magendie; namely, that, when the brain and a large portion of the cerebellum of a duck is removed, though the instinct of seeking food and even the power of deglutition may be lost, yet, if food be conveyed into the stomach, it will be digested.

Digestion
said to take
place
chiefly in
the cardiac
portion.

If we are to believe some accounts, the cardiac portion of the stomach is the chief seat of digestion; and when a part of the food has there been acted upon in a certain degree, it is conveyed along the large curvature to the pyloric portion, where the process is completed. It seems also now to be established, that the digestive process does not go on equally through the whole mass of the food, but principally where this is in contact with the stomach; that it proceeds gradually from the surface to the centre of the mass, and that, as soon as a portion is reduced to a homogeneous consistence, it is transmitted into the duodenum, without the delay that would result from awaiting a similar change of the whole.†

Chymifi-
cation.

The food having undergone a sufficient degree of maceration and mastication, or other mechanical process, by which it is reduced to a state of sufficiently minute division, it is acted upon by the gastric juice and the peristaltic contractions of the stomach, and the result is a complete change in its properties, its conversion into chyme; an alteration in every respect analogous to a chemical change. During the process of chymification, heat is occasionally extricated, and not unfrequently gas, composed of carbonic acid, hydrogen, and azote in various proportions, is evolved. Dr. Bostock

* In relation to this point, I may again advert to the case of a healthy young man, who had a fistula in the epigastric region, communicating with the stomach, the consequence of a gunshot wound. Dr. Lovell, of the United States, having collected in a phial a certain quantity of the fluid that escaped from the opening, put a bit of meat into it, which dissolved with great readiness. See Andral, *Anat. Pathol.* t. ii. p. 27. — EDITOR.

† Prout, in *Annals of Philos.* 1819.

regards these, however, not as necessary steps in the process, but rather as the consequence of a morbid state of the function.* Previously to Dr Prout's experiments, the generation of acid in the stomach used also to be considered in the same point of view.

Chyme is not always of the same quality, its properties depending much upon the nature of the food. According to recent experiments, made on dogs and horses, it appears that liquid albumen forms under the natural process of digestion a homogeneous fluid, in which the albumen remains quite unaltered; and this sort of chyme passes the pylorus more rapidly than any other. Coagulated albumen is much more slowly dissolved, and the fluid produced possesses the properties of coagulated albumen dissolved in acetic acid. Fibrin and vegetable gluten undergo a similar change. Gelatin is converted into a clear brownish fluid, in which neither gelatin nor albumen can be discovered. White cheese forms an opaque dirty white fluid, containing much animal matter, which, however, is neither the case with gelatin nor albumen. Starch is gradually dissolved, and loses its reaction with iodine, being converted into sugar and amidine. The results obtained with compound articles of food, such as milk, beef, bread, and oats, in various states of mixture, were such as the foregoing facts would lead one to anticipate. Bones gave a liquid that contained not only animal matter, but a large quantity of lime. The general result is, that all the animal principles, except liquid albumen, undergo a material change during chymification, which change generally consists in their being made to approach nearer in their nature to albumen.]

Chyme.

So far, therefore, as the organ of the stomach is concerned in the digestive function, we have some insight into the process. But beyond this, that is to say, of the nature of chylication, we have little or no knowledge that can be depended upon.

Digestive process only partially known. Chylication.

The aliment having been reduced to chyme in the stomach, is propelled into the duodenum, where it is converted partly into chyle, which is absorbed into the system from the small intestines, and partly into a residual matter, that assumes the nature of feces in the large intestines, and is ultimately rejected from the system. As it is into the duodenum that the biliary and pancreatic ducts discharge their respective fluids, chylication is generally presumed to be essentially connected with the action of the bile and pancreatic liquor.

[The constancy of the liver, not only in all red-blooded animals, but in the intervertebral with colourless blood, wherever a heart and blood-vessels are present, its magnitude, and the destructive and grievous consequences arising from its diseases, are convincing proofs of its high importance in the animal economy. With these facts, it may seem extraordinary, that physiologists should not be in possession of some clear information, respecting the functions of this organ, and the uses of the bile. In particular, the action of the latter secretion in chylication is but imperfectly

Function of the liver.

* Elem. Syst. of Physiol. vol. ii. p. 491. Dr. Abercrombie also believes, that, in healthy digestion, no gas is generated in the stomach; but that a certain quantity is evolved in the further progress of the alimentary matters through the intestines, especially in the colon. See Pathol. and Pract. Researches on Diseases of the Stomach, &c. p. 71. ed. ii. S. C.

understood. Its ordinary production from venous blood is a peculiarity that does not belong to any other secretion*; while the great difference of its chemical qualities from those of every other fluid in the body, is a point not less remarkable.

Use of the
bile.

One obvious mode of forming a judgment of the uses of the bile, is to remark what ill effects result from the stoppage of its flow into the intestinal canal. On this point, however, the most discordant statements prevail. If we are to credit Dr. G. Fordyce, when the ductus communis choledochus is tied, or blocked up by a calculus, the formation of chyle is not prevented, and consequently the biliary secretion is not essentially necessary for digestion. The same conclusion, with respect to its having no share in the formation of the chyle, is also adopted by some distinguished physiologists of the present time, as will be presently explained. On the other hand, Mr. Brodie, after tying the common biliary duct in young cats, was led to espouse an opinion long ago prevalent, that the principal use of the bile was to separate the chyle from the chyme; for he found, that when that duct was tied, and food given, chymification went on in the stomach as usual, but that no chyle could be detected in the intestines, or the lacteals, which only contained a transparent fluid, imagined to be lymph, and the watery part of the chyme. (See *Journal of Science and the Arts*, vol. xiv. p. 343.) The same view is also supported by Mr. Mayo's experiments.

Experiments of
tying the
vena portæ
and hepatic
artery.

Leuret and Lassaigue tied the common duct in a dog, and cleared out the intestines by giving the animal a little castor oil. Twelve hours after the operation, they thrice gave it bread and milk with sugar, at intervals of six hours; and, eight hours after the last meal, it was strangled, and immediately opened. The stomach contained an acid pulp, and a very soft whitish sweet chyme adhered to the villous coat of the duodenum, and increased in consistence downwards. In the great intestines, it was firm, but had the same colour, and was nearly destitute of taste and smell. The thoracic duct was distended with a yellowish red transparent fluid, which coagulated on exposure to the air, and yielded the usual proportion of fibrin, albumen, and saline matters.

Tiedemann and Gmelin, whose investigations are more elaborate and precise, remarked, that animals were attacked with vomiting soon after the operation; then with thirst and aversion to food; and that, on the second or third day, the conjunctiva of the eyes became yellow, the stools chalky and very fetid, and the urine yellow, and convertible to blue, and then red, by nitric acid. Some

* In some rare instances, the vena portæ, instead of going to the liver, has terminated directly in the lower vena cava; yet bile was secreted, and, of course, from arterial blood. (Abernethy in *Phil. Trans.* vol. lxxxiii., and Lawrence in *Med. Chir. Trans.* vol. iv. p. 174.) M. Simon found, that tying the hepatic artery in pigeons did not prevent the secretion of bile; but that a ligature on the vena portæ had this effect. On the other hand, Mr. B. Phillips tied this vein in two dogs, and observed that in both instances bile continued to be secreted, though in small quantity. His experiments on the hepatic artery agree with those of M. Simon. The variety in the distribution of the vena portæ affects several hypotheses respecting the use of the liver, and especially that of M. Magendie, which represents all drink as passing through the branches of this vein, and as undergoing some change in the liver, previously to their entrance into the circulation.

of the animals died; others were killed. Of the latter, some had previously recovered from the jaundice, owing to the re-establishment of the duct by the effusion of lymph around the tied part, and the subsequent discharge of the ligature; a fact also noticed by Mr. Brodie in his experiments. In the cases, in which the biliary duct continued impervious, the colouring matter of the bile was found in the blood, the serous membranes, the cellular tissue, the coats of the arteries and veins, and in the fat. It was further observed that chymification went on as perfectly as in a sound animal. In the small intestines, they found nearly the same principles as in the healthy state, with the exception of those derived from the bile; and, in particular, they found in the duodenum, and in contact with its membrane, the soft mucous flakes which some physiologists consider, though, as Gmelin and Tiedemann think, erroneously, to be chyle. With the exception of the absence of certain biliary principles, the contents of the great intestines were likewise similar to those met with in the bowels of healthy animals; but they had an exceedingly fetid smell. In such animals as had been fed a little while before death, the thoracic duct and the lacteals always contained an abundant fluid, generally of a yellowish colour. It coagulated, like ordinary chyle; the crassamentum acquired the usual red colour; its difference from the chyle of a sound animal was, that after tying the ductus choledochus, it was never white. The reason of the difference is ascribed to the circumstance of the white colour depending upon fatty matter taken up from the food by means of the bile, which possesses the power of dissolving fat, and probably, therefore, aids in effecting its solution in the chyle at the mouths of the lacteals. It is supposed that Mr. Brodie was deceived by the absence of the white colour, which, it is true, the chyle usually possesses, but which, as it is well known, it does not exhibit unless the food contain fatty matter. Mr. B. Phillips also infers, that chyle may be formed independently of the influence of the biliary secretion, and he not only adverts to examples in which the ductus communis had been rendered impervious, by the pressure of tumours, but gives the particulars of experiments made on four dogs, in which he found chyle in the thoracic duct, after the ductus communis had been tied.

The following are the uses ascribed to the bile by Tiedemann and Gmelin; First, By its stimulant properties, it excites the flow of the intestinal fluids, as is proved by the unusual dryness of the feces in jaundiced persons, and in animals, whose common duct has been tied. Secondly, It probably stimulates the intestinal muscular fibres to action. Thirdly, As it contains an abundance of azotized principles, it may contribute to animalize those articles of food which have no azote in their composition. Fourthly, It tends to prevent the putrefaction of the food during its course through the intestines; because, when it is prevented from flowing into them, their contents are much further advanced in decay than in the healthy state. Fifthly, It probably tends to liquefy and render soluble the fatty part of the food. Lastly, It is to be regarded as an important excretion.

According to the researches of the same physiologists, many of the principles of the bile, such as its resin, colouring matter,

Use of bile,
according
to Tiede-
mann and
Gmelin.

Liver and
lungs
function-
ally con-
nected.

fatty matter, mucus, and salts, are thrown out of the body, with the feces, in the natural state of the biliary system, or by the urine, or into the cellular tissue, when the excretory duct of the liver is obstructed. These principles contain a large proportion of carbon, and would appear, therefore, to be intended to carry off the excess of that element which is introduced into the system with vegetable food, and not thrown off by the lungs. In the lungs, it is thrown off in the state of oxidation; in the liver, chiefly in union with hydrogen, and in the form of resin and fatty matter. That the liver is thus intended to assist the lungs in decarbonizing the blood seems to Gmelin and Tiedemann confirmed by the following facts: The resin of the bile abounds most in herbivorous animals, whose food contains a large proportion of carbon and hydrogen. In various tribes of animals, the pulmonary and biliary organs are in a state of antagonism to one another; a fact particularly insisted upon by Fourcroy. The size of the liver and the quantity of the bile are not proportionate to the quantity of the food and frequency of eating; but inversely to the size and perfection of the lungs. Thus, in those warm-blooded animals, which have capacious lungs, and live always in air, the liver, compared with the body, is proportionately less than in such as live partly in water. The liver is proportionately larger in reptiles, which have lungs with large cells, incapable of rapidly decarbonizing the blood; also in fishes, which decarbonize the blood but slowly by the gills; and, above all, in molluscous animals, which effect the same change very slowly, either by gills, or small, imperfectly developed lungs. Another thing, pointed out as highly deserving notice, is the increased quantity of blood transmitted through the liver, when the pulmonary system becomes less perfect. In mammalia and birds, the vena portæ is formed by the veins of the stomach, intestines, spleen, and pancreas; in the tortoise, it receives also the veins of the hind legs, pelvis, tail, and vena azygos; in serpents, it receives the right renal, and all the intercostal veins; in fishes, the renal veins, and those of the tail and genital organs.

Another observation, made by the same professors, is, that, during the hybernation of certain animals of the class mammalia, when respiration is suspended, and no food is taken, the secretion of bile goes on. An additional argument, in favour of the preceding hypothesis, is deduced from the physiology of the fœtus, in which the liver is proportionately a great deal larger than in the adult, and in which the bile is secreted abundantly, as appears from the great increase of the meconium during the latter months of pregnancy. Finally, another argument is derived from pathological facts. According to Tiedemann and Gmelin, in pneumonia and phthisis, the secretion of the bile is increased; in diseases of the heart, the liver is enlarged; and, in the morbus cæruleus, the liver retains its fœtal state of disproportion. In hot climates, where, in the opinion of these physiologists, respiration is less perfectly carried on than in cold ones, owing to the greater rarefaction of the air, a vicarious decarbonization of the blood is established by an increased flow of the bile.

The foregoing hypothesis is, perhaps, better supported than that of Sir Everard Home, who considers one of the offices of the bile to be that of converting mucus, or the refuse matter of the chyle,

as it passes along the colon, into fat, which is absorbed into the system. This indefatigable physiologist was partly induced to adopt this opinion by the example which he met with of a child, in which the peristaltic action of the bowels had been duly continued, and stools regularly produced, without any intermixture of bile, and even when no gall-bladder, nor any duct leading from the liver into the duodenum, existed.* The mere circumstance of this child being in a state of marasmus at its death, without any manifest intestinal disease, however, scarcely warrants the theory attempted to be built upon it, and which may be regarded as the reverse of what is inculcated by Fourcroy, Gmelin, and Tiedemann, who represent the bile as depriving the system of its redundant carbon and hydrogen, and not as a means of supplying a larger quantity of these elements to it.

Whether
fat be
formed
from bile?

Besides the secretion of the duodenum itself, which is supposed to be concerned in chylication, the pancreatic juice is another fluid apparently intended for the same purpose. The common opinion has been, that, in its nature, it is very similar to saliva: Tiedemann and Gmelin, however, represent it as differing materially from this fluid, and never containing any sulpho-cyanic acid, free soda, or mucus; as being naturally acid; having a much larger quantity of solid matter; and especially a greater proportion of albumen; and, in the dog at least, a peculiar principle soluble in water and in alcohol, and, when pure, precipitated rose-red by chlorine. Sometimes, it contains also a good deal of phosphate and acetate of soda. The pancreatic fluid of the dog, horse, and sheep, when heated, yields a large quantity of coagulum, which the saliva does not. The particular use of the pancreatic secretion in digestion is unknown. Tiedemann and Gmelin, reasoning from the large quantity of azotized principles which it contains, presume, that its use may be to animalize vegetable food. They remark, as a confirmation of this opinion, that the pancreas is much larger in herbivorous, than carnivorous animals.†

Pancreatic
juice.

Of the action of the omentum and spleen we know nothing certain. The spleen secretes no peculiar fluid; its blood is of a dark livid colour, and coagulates with difficulty. It is even destitute of an excreting duct; and, in some instances, has been extirpated without injury to the general health. It is not found in any tribes below the class of fishes. [To some of the hypotheses concerning the use of the spleen, reference has already been made. The experiments of Leuret and Lassaigne, lead them to revive the hypothesis, that the spleen is a mere diverticulum for the blood during digestion. When the stomach and intestines are distended with food, and the process of digestion is going on, the blood flows in an increased quantity to the villous membrane of the whole alimentary canal, and consequently more venous blood requires to be returned by the hepatic vessels. These, however, being presumed to be inadequate to the purpose, the splenic veins and cells become gorged. It was found, that the spleen of the dog, which generally weighs but a few ounces, acquired the weight of a pound and a half, two hours and a half after a ligature had been

Spleen.
Omentum.
Their of-
fices not
known.
Spleen not
found be-
low the
class of
fishes.

* Phil. Trans. 1813, art. 21.

† See Edin. Med. and Surg. Journ. Nos. 91 and 93.

applied to the vena portæ. In the dog, cat, rabbit, guinea-pig, and other mammalia, the spleen presented a rosy or vermilion tint while the animals were fasting; after chymification had begun, it assumed a blue colour, and was somewhat tinged; but it did not acquire its deep bluish black colour, and greatest turgescence, till the chyme had passed the pylorus, when the intestinal membrane participated in the activity previously confined to the stomach. This hypothesis is liable to the objection, that, if true, the absence or removal of the spleen ought always to occasion more serious consequences than it is said to do.

Whether
the spleen
be an organ
of sanguif-
ication.

Tiedemann and Gmelin represent the structure of the spleen as essentially resembling that of the lymphatic glands, and regard it as an organ which is merely an appendage to the absorbent system. They believe that its specific function is to secrete from the blood a reddish fluid that has the property of coagulating, is carried to the thoracic duct, and, being there united with the chyle, changes it into blood. The facts, elucidated by the experiments of these physiologists, are of great value: yet, their hypothesis, relative to the spleen being an organ of sanguification, is seriously shaken by the facts, that a vast difference really exists between the structure of the spleen and that of an absorbent gland; that the chyle does not invariably exhibit a reddish hue; and that the absence or removal of the spleen may happen, not only without fatal effects, but even without much subsequent disturbance of the animal economy.

Chyle.

Notwithstanding the progress of animal chemistry, and the multiplication of experiments on living animals, we are obliged to confess, that our knowledge of the rationale of chyfication is still involved in considerable obscurity. But, though we know not the exact way, in which this process is effected, our acquaintance with the properties of the chyle itself is more satisfactory. For the most accurate information concerning the chyle, we are indebted to Dupuytren, Vauquelin, Emmert, Marcet, Prout, Tiedemann and Gmelin.* If the animal, from which the chyle is extracted, has eaten animal or vegetable substances of a fatty nature, the liquid, drawn from the thoracic duct, is of a milky appearance, a little heavier than distilled water, of a strong spermatic odour, of a salt taste, slightly viscid, and plainly alkaline. It soon separates into three parts: a solid one, that remains at the bottom; a liquid one, at the top: and a third, which forms a very thin layer on the surface. At the same time, the chyle assumes a bright rose colour. When, however, it is derived from food void of fat, it is opaline, and nearly transparent, instead of being of an opaque white colour, and the layer on the surface is less evident. Chyle never takes the hue of colouring substances in the food. M. Hallé proved this by direct experiments. Magendie also made animals eat indigo, saffron, and madder, without the colour of these articles being communicated to the chyle. This fact, which is confirmed by the experiments of Tiedemann and Gmelin in Germany, Andrews at Edinburgh, and Lawrence and Coates in America, is very important, because it is at variance with Mr. Hunter's statement, and upon its correctness the truth of the theory, which

* See *Recherches Expérimentales, &c. sur la Digestion dans les quatre Classes d'Animaux Vertébrés.* Paris, 1826.

restricts the function of the lacteals entirely to the absorption of chyle, and of no other matter, mainly depends. Chyle, derived from sugar, contains hardly any fibrin; while that from flesh has a great deal. The appearances and quality of this fluid are, therefore, considerably modified by the kind of food; and it deserves particular recollection, that, as it is not always white, its pink or transparent look is not to be regarded as a proof, either of the lacteals having imbibed madder, or of the imperfect formation of the chyle.] M. Magendie's experiments lead him to conclude, that a dog, upon an average, forms about six ounces of chyle every hour. The subject is highly interesting: but to pursue it further, and especially into that diversity of structure which the digestive organs present in almost all the different classes and orders, adapted, as it is in each of them, with the most skilful attention, to the general economy of their nature, and the mode of life they are destined to lead, would occupy more space than we can spare, and carry us into the regions of general physiology. Enough has perhaps been said, and this is all that has been aimed at, to give a compendious view of the organs, which form the seat of that class of idiopathic diseases, with which the nosological system about to be unfolded commences, and consequently to enable the reader to follow up those diseases with greater clearness and comprehension in their distinctive characters and descriptions.*

Its quantity
calculated.

I have limited the above remark to *idiopathic* diseases; and it is necessary the limitation should be attended to. For, from the intimate connection, which the organs of digestion maintain with other organs, and sets of organs, there are few general complaints, in which the first do not evince some *sympathetic* affection. This is particularly the case with the stomach, which, in the opinion of Mr. Hunter, is the seat and centre of universal sympathy: a doctrine which appears to have been taught in France by M. de Bourdeu†, though with less caution, and from fewer premises, at the very time Mr. Hunter was teaching it in London.

Class li-
mited to
idiopathic
diseases.

Stomach
the seat of
universal
sympathy.

The sympathetic affections, here spoken of, cannot fall within the range of the present class; but must necessarily appertain to those diseases, and divisions of diseases, under which they rank as peculiar symptoms, and which can only be removed by removing the idiopathic malady.

* Dr. Abercrombie sums up, in a few words, the principal circumstances necessary for the healthy condition of the process of digestion: 1. A healthy state of the muscular action of the stomach; 2. A healthy, consecutive, and harmonious action of the muscular coat of the intestinal canal; 3. A healthy state of the fluids of the stomach; 4. A healthy state as to the quantity and quality of other fluids, derived from the liver, pancreas, and mucous membrane of the intestines; 5. A healthy state of the mucous membrane itself, both in the stomach and the intestines. See *Abercrombie's Pathol. and Pract. Researches on Diseases of the Stomach*, &c. p. 71. ed. 2. S. C.

† See his Thesis, "An Omnes Corporis Partes Digestioni opitulatur?" Paris, 1754.

CLASS I.
C Œ L I A C A.

ORDER I.
ENTERICA.

*DISEASES AFFECTING THE ALIMENTARY
CANAL.*

DISQUIET OR DISEASED ACTION IN SOME PART OF THE PASSAGE
FOR THE RECEPTION AND DETRITION OF FOOD.

CLASS I.
Division
into two
orders.

THE diseases of the DIGESTIVE FUNCTION form the first class in the Nosological System about to be unfolded; and to these, from the Greek term ΚΟΙΛΙΑ, "alvus," "venter," or "the lower belly," I have applied the classic name of CŒLIACA.

By an easy and natural arrangement, this class is divisible into two orders: the first embracing those disorders which affect the alimentary canal; and the second, those which affect the collatitious or auxiliary viscera. The former I have distinguished by the term ENTERICA, and the latter by the term SPLANCHNICA, both of which are Greek adjectives; the one being a derivation from έντερον, "intestinum," "alvus;" and the other from σπλάγχχον, "viscus," "a bowel, or entrail."

The present order embraces the following genera:

| | |
|-------------------|-------------------------|
| I. ODONTIA. | MISDENTITION. |
| II. PTYALISMUS. | PTYALISM. |
| III. DYSPHAGIA. | DYSPHAGY. |
| IV. DIPSOSIS. | MORBID THIRST. |
| V. LIMOSIS. | MORBID APPETITE. |
| VI. COLICA. | COLIC. |
| VII. COPROSTASIS. | COSTIVENESS. |
| VIII. DIARRHŒA. | LOOSENESS. |
| IX. CHOLERA. | CHOLERA. |
| X. ENTEROLITHUS. | INTESTINAL CONCRETIONS. |
| XI. HELMINTHIA. | WORMS. |
| XII. PROCTICA. | PROCTICA. |

GENUS I.

ODONTIA.

MISIDENTITION.

PAIN, OR DERANGEMENT OF THE TEETH OR THEIR INVOLUCRES.

THIS genus has by some writers been called odontalgia, and odaxismus. But, as both these terms have been limited by other writers to a single species of the genus, that of odontia *dolorosa*, or tooth-ache, in order to prevent confusion, I have ventured to give it the name under which it now appears; derived from *ὀδών*, “a tooth,” which in fact is the common root of all the terms, and is here preserved in its simplest form.

GEN. I.
Generic
name.

The involucres of the teeth are their gums, membranes, and sockets, or alveoli. The last, although an immediate apophysis of the jaw-bones, are rather to be regarded as an appurtenance of the teeth, than of the bones from which they issue. They are altogether limited to the duration of the teeth, sprouting forth at their commencement, and being carried away by absorption, on their decay or removal. They are also in every instance modelled by the shape of the teeth; and, like the gums, participate in almost all their diseases.

The character of the present genus is therefore made sufficiently general to embrace the disorders of these adjuncts of the teeth, as well as of the teeth themselves; all which, as distinct species, may be conveniently arranged in the following order:

Species.

- | | |
|-------------------------|-------------------------|
| 1. ODONTIA DENTITIONIS. | TEETHING. |
| 2. ——— DOLOROSA. | TOOTH-ACHE. |
| 3. ——— STUPORIS. | TOOTH-EDGE. |
| 4. ——— DEFORMIS. | DEFORMITY OF THE TEETH. |
| 5. ——— EDENTULA. | TOOTHLESSNESS. |
| 6. ——— INCRUSTANS. | TARTAR OF THE TEETH. |
| 7. ——— EXCRESCENS. | EXCRESCENT GUMS. |

SPECIES I.

ODONTIA DENTITIONIS.

TEETHING.

IRRITATION FROM CUTTING THE TEETH.

DR. CULLEN did not allow dentition to enter into the list of diseases: but, this is to suppose the process of teething to take place at all times, instead of only occasionally, with perfect ease, and without irritation of any kind. Whenever it occurs in this manner, there is undoubtedly no disease, and so far Dr. Cullen is

GEN. I.
SPEC. I.
Odontia.
Teething,
how far a
diseased
action.

GEN. I.
SPEC. I.
Odontia
Denti-
tionis.
Teething.

Peculiarities of the human teeth.

correct. But, in a very large number of cases, perhaps, in refined and intenerated society, in the larger number, there is not only disease, but, in many instances, disease of an alarming and fatal character; strikingly severe in its progress and complicated in its symptoms. The organism of the *teeth*, indeed, is peculiarly distinguished by the following feature: that there is no other part of the human structure so brief in its duration, and none, with the exception of the uterus, so signalised by pain and inconvenience during its progress. Yet, their mechanism, notwithstanding these evils, is most admirable. No effort of human wit has ever been able to improve upon it, even in imagination, and no organ is more strikingly impressed with marks of supernal goodness and intelligence. [The human teeth differ from those of animals in being all of one length, and having no considerable interspaces between them. Another of their peculiarities is the perpendicular direction of the lower incisors. In animals, these teeth slant backwards, and the jaw also slopes backwards directly from the alveoli, so that the full prominent chin is found only in man, while in animals it seems as if it were cut off. In man, the obtuse tubercles of the grinders are very particular, not resembling the flat crowns with rising ridges of intermixed enamel, belonging to herbivorous animals, nor the cutting and tearing grinders of carnivorous ones.]

There are three periods of life, in which dentition, or the breeding and cutting of teeth, uniformly takes place: in infancy, in boyhood, and adult age. Besides which, we meet with instances occasionally of a reproduction of teeth in advanced life. Each of these formations is accompanied with circumstances peculiar to itself; and, when attended with pain, or morbid action of any kind, affords a distinct modification of the present species of disease, and consequently lays a foundation for the four following varieties:

- | | |
|-----------------------|--|
| α Lactentium. | Cutting the milk or shedding teeth. |
| β Puerilis. | Cutting the second set or permanent teeth. |
| γ Adulorum. | Cutting the adult or wise teeth. |
| δ Senilium. | Cutting teeth in advanced life or old age. |
| Milk teething. | |
| Permanent teething. | |
| Adult teething. | |
| Climacteric teething. | |

Economy of dentition.

First set of teeth.

Before we enter upon the symptoms of these varieties, it is necessary to give some explanation of the causes which produce them; or, in other words, to take a brief glance at the order and economy of dentition.

As the jaw-bones of youth are both wider and longer than those of infancy, it is obvious that the teeth, which are cut in the first year, must be incapable of filling up the bony arch of the fourteenth. They might, indeed, have been so contrived as to grow in proportion to the increased range of the jaw-bones; but from their being extraneous bodies, this must have been a complex process, while the very circumstance of their growth, and the internal change which must have continually taken place, would have exposed them to many more diseases, than they are subject to at present.

A much simpler plan has been devised; and the teeth of man, as indeed of most mammalia, are composed of two distinct sets, differing both in number and structure: the first, or smaller set, consisting of ten for each jaw, which are cut between the [sixth and twenty-fourth month after birth; the most common period of their first appearance, however, being the commencement of the seventh*,] shed between the seventh and fourteenth year, and from the period of their protrusion called milk-teeth; and the second, or larger set, consisting of fourteen, fifteen, or sixteen for each jaw, for they occasionally vary in number, which are cut progressively, upon the shedding of the first set, between the seventh or eighth, and the seventeenth or eighteenth year; and which, from their continuing till old age, except in cases of accident or disease, are denominated permanent teeth. The farthest grinder on each side, however, is seldom cut so early as the eighteenth year, generally after the twentieth, and sometimes not till the thirtieth; on which account, these teeth are denominated *dentes sapientie*, or teeth of wisdom.

GEN. I.
SPEC. I.
Odontia
Denti-
tionis.
Teething.

Although, in the human subject, the teeth are of no use until a certain time after birth, preparations for their formation commence in the early stages of fetal life. Then the rudiments of all the first set, and of four belonging to each jaw of the second set are produced, and may be distinctly seen when the fœtus is about four months old: M. Serres declares that he has traced them, and even the teeth, at three.† [The jaw of a new-born child contains a number of cells, separated from each other by imperfect bony septa. By removing the external or internal plate of the jaw, the contents of these cells are exposed. They consist of membranous bags, named the *capsules* of the teeth, enclosing the rudiments of the bodies of these organs, and certain soft vascular substances, termed the *pulps*, on which the bodies of the teeth are forming. The bone of the body of the tooth is the part first formed; the enamel is added to this; and the fang appears the last in order. The pulp, which, according to Meckel, grows up from the bottom of the capsule, about the fourth month of fetal existence, accurately resembles in shape the body of the tooth which is to be formed on it. It is a soft vascular substance, and its vessels are most numerous in that part which is covered by the portion of tooth already formed. The capsule is a whitish membrane, but very vascular on its inner surface. It includes the pulp, round the basis of which it adheres, and the rudiments of the imperfect tooth. On its outer surface it adheres firmly to the gum; so, that, if we attempt to tear the last-mentioned part away from the jaw of

Rudiments
produced in
the fœtus.

Process by
which they
are formed.

Capsules.

Pulps.

Bone.

Enamel.

Fang.

* Meckel, Manuel d'Anat. tom. iii. p. 351. A tooth, considered in the most general view, is essentially composed of two parts: one of these, which is constant and always the same, is the secreting part (the soft portion or pulp); the other, which is more or less developed according to the nature of the animal, and varies in shape, disposition, and number of its layers, is the secreted part; the hard portion placed on the edges of the jaws, and sometimes on the vault of the palate, or at other points of the cavity of the mouth. See Andral, Anat. Pathol. t. ii. p. 259.

† Essai sur l'Anatomie et Physiologie des Dents, p. 3. 8vo. Paris, 1817. Andral states, that their rudiments may be detected in the 10th week, as their pulpy portion is then in the jaw; and that, at three months, it is covered with osseous points. Anat. Pathol. t. ii. p. 259.—EDITOR.

GEN. I.
SPEC. I.
Odontia
Denti-
tionis.
Teething.

a fœtus, the capsules and their contents will come away at the same time. These membranes adhere less closely to the bony cells in which they are contained. The office of the capsule is that of secreting the enamel: in its cavity is a small quantity of fluid. The ossification commences by the formation of the cutting edge of the incisors, and the grinding basis of the molares. The bony substance being deposited on the pulp, as on a mould, the rudiments of the teeth are necessarily hollow; and the bony layers, first formed, are those which will be in contact with the enamel when it is deposited. As the formation of the tooth advances, the pulp is gradually surrounded, till the whole is covered by bone, except its base.

Con-
nec-
tions of the
pulp, and
its changes.

The adhesion of the pulp to the newly-formed tooth or bone is very slight, and no vessels can be discerned going from one to the other: it is, however, most strongly attached round the thin elastic edge, which is the last part formed. When the bone has covered all the pulp, it begins to contract a little, and becomes somewhat rounded, making that part of the tooth which is called the *neck*, and from this place the *fangs* begin. The formation of the fangs makes the bodies of the teeth ascend through the sockets, and afterwards through the gum, which is absorbed in consequence of the pressure of the tooth.

Manner in
which the
fang is pro-
duced.

The pulp has originally no process answering to the fang; but, as the cavity in the body of the tooth is filled up by the ossification, the pulp is lengthened, and the fang forms over it. The latter part grows in length till the whole body of the tooth is pushed through the gum, the socket at the same time contracts at its bottom, and grasps the neck or beginning fang, adheres to it, and rises with it. Thus the alveolus is raised with the fang, and the fang does not itself sink or descend into the jaw.

Process
when there
are several
fangs.

If two or more fangs are to be formed, the process is rather more complicated. When the body of a molaris is completed, there is but one general cavity in the tooth, from the brim of which the ossification is to shoot, so as to form two or three fangs: if two only, then the opposite parts of the margin of the cavity shoot across where the pulp adheres to the jaw, meet in the middle, and thereby divide the mouth of the cavity into two openings, from the edges of which the two fangs grow. It is a curious circumstance, however, that at the very time when the pulp is restricted to the crown of the tooth, the number of future fangs is already denoted by that of distinct branches given off by the dental vessels.* When the surface of the tooth first appears through the gum, its body is yet more hollow than that of a perfect tooth, and the fang is only in an incipient state. In proportion as the tooth rises through the gum however, the hollow is gradually filled up and the fang is lengthened. When the bone of the body of the tooth is somewhat advanced in its formation, the enamel begins to be deposited on its surface from the vessels of the capsule. This deposition commences on the masticating surface of the tooth, and thence extends towards the root. The enamel is complete when the fang of the tooth begins to be produced, for at that time the body penetrates the gum, and thereby lays open the capsule, which at this period is found to have undergone great alteration in its

Final
change of
the capsule.

* Meckel, Manuel d'Anat. tom. iii. p. 343.

texture and appearance. Instead of the soft vascular surface which it exhibited while the deposition of the enamel was going on, it is now dense, and almost tendinous, with very few blood-vessels. When the fang begins to grow, the capsule also becomes connected to it, and forms its periosteum.]

From what has been said, it appears that the alveolus, or socket, shoots up from the jaw-bone as the tooth advances. It accompanies its growth, and at first entirely surrounds it; by which admirable contrivance a firm support is given to the gums from the time of birth, and the infant is enabled to make a sufficient pressure for the purpose of sucking, without interfering with the form which the teeth, yet soft and amorphous, are destined gradually to assume. In due time, however, the alveolus yields in its upper surface, as the tooth, in consequence of the gradual elongation of its fang or fangs, is forced through, and cuts not only the socket but the gum; and when the first set, having answered its temporary purpose, loses its fangs by absorption, and the body of each tooth is shed or cast out by the gums, the attendant sockets are equally absorbed, and disappear at the same time.

GEN. I.
SPEC. I.
Odontia
Denti-
tionis.
Teething.

Growth of
the socket.

Its absorp-
tion.

Second set
of teeth.

Seems to
vary in
time of
occurrence.

This wonderful change begins to take place, as I have already observed, about the seventh year, the artery of the milk teeth and its canal undergoing a more or less perfect obliteration*; at which time we possess far more teeth, including both the grown and the growing, than at any other period whatever: for we have in each jaw ten temporary teeth complete, ten incomplete to succeed them, and the two permanent grinders, whose stamina were formed during foetal life, making not less than forty-four in the whole. Other writers than Mr. Hunter place this change at an earlier period: Dr. Blake, indeed, as early as the fourth year†; and M. Lemaire, who follows Blake in most other points, follows him in this also.‡ The permanent teeth have separate sockets of their own; and, in consequence of the prolongation of the jaw-bones, do not lie immediately under the corresponding shedding teeth, nor directly contribute to the process of shedding, which chiefly takes place in consequence of the absorption of the fangs and sockets of the temporary set, though their ascent contributes in some degree to the general process.

Changes in
advanced
life.

I have observed that the alveoli, or sockets, though fixed upon the jaw-bones, and indeed issuing from them, are rather to be regarded as appendages of the teeth than of the bones from which they spring; that they participate in most of the diseases of the teeth, and are strictly coeval with them; sprouting forth on their origin, modelled by their shape, and disappearing on their decay or removal. It is this disappearance, which is the work of absorption, that principally produces that change in the character of the face which peculiarly distinguishes the period of old age. It follows closely upon the loss of all the teeth; and when these have uniformly given way, and their respective sockets are no longer in existence, as not being wanted, the upper jaw becomes considerably diminished in its range, the under jaw reduced to a thin bone merely covered by the gums, and the roof of the mouth, instead of

* Serres, p. 19.

† Dissertat. Inaugur.

‡ *Traité sur les Dents*, 8vo. Paris, 1822.

GEN. I.
SPEC. I.
Odontia
Dentitionis.
Teething.
Different position of teeth in different animals.

being arched, is rendered almost flat. And from this loss of substance, which is nearly equal to an inch and a half in depth, the face becomes shortened, the cheeks wrinkled, and the chin projecting.

It is curious to observe how differently the teeth are situated in different animals. In the more perfect, they are placed in sockets in the jaw-bones, some of which are in many kinds rendered moveable, as the two fore teeth of the lower jaw of the *mus maritimus*, or African rat, the largest species of the genus hitherto discovered. The same teeth are equally moveable in the kangaroo; and the hollow tusks or poisoning fangs of the rattlesnake, and other venomous serpents, are capable of depression or elevation at the option of the animal. In the lamprey and myxine the teeth, which are almost innumerable, are placed on the surface of the tongue; in the cancer genus, in the stomach; where we likewise find them in the common earwig. In the cuttlefish, they are also placed in the middle or lower part of the body, two in number, and horny, and in their figure resembling the bill of a parrot. In the echinus, or sea-hedgehog, they are five in number, arranged around the opening of the under part of the shell, and, being moveable by different muscles, they form a very complete organ of mastication. In the *aphrodita aculeata*, or sea-mouse, they are fixed upon the proboscis, four in number, and are consequently extended or retracted with this organ at pleasure. The leech has three pointed cartilaginous teeth, which it is able to employ in the same way, and by means of which it draws blood freely.*

Orders of animals possessing teeth often derived from their varying forms.

The form of the teeth is so different, even in the different genera of animals that possess them in a true or perfect state, that this diversity has been laid hold of by many naturalists, as a distinguishing characteristic of their kinds or orders. Linnæus, confining himself to the fore-teeth, has hereby formed seven distinct orders for the class of mammalia; and M. de Blainville, carrying the basis of this distinction farther than to the form and structure of the fore-teeth, has made it a foundation for the subdivisions of these orders into genera.†

Whatever be the time in which teeth are generated and protruded, the process is often so gradual that little or no pain or other inconvenience is experienced; and consequently, under such circumstances, there is no disease. But I have already observed, that there is often not only pain and irritation, and therefore disease, but, in various instances, disease of a severe, complicated, and alarming character. And it is to *dentition* under these circumstances, that I am now about to direct the reader's attention.

It will readily be supposed, that the most violent symptoms of dentition are those produced under the first stage referred to in the preceding history, or during the growth and protrusion of the MILK or SHEDDING TEETH; for the system is then in its tenderest state of infancy, and prone to disorder from very slight causes of irritation.

The immediate cause of irritation in the present instance is the

* See, for other peculiarities, Phil. Trans. vol. lxxxix. p. 237. ; xci. p. 319.

† Nouveau Dict. d'Hist. Naturelle, vol. ix. art. DENTS. Paris, 1817.

pressure of the teeth in the gums; and the degree of irritation depends upon the peculiar temperament of the child. [But, in addition to this circumstance, it may be stated as a general fact, that, the greater the number of teeth coming forward simultaneously, the greater the risk of indisposition; and every man of experience knows that those children which cut their teeth late, usually suffer least.] As the teeth push forward, the superincumbent gum wastes in consequence of absorption, and is at last cut through, and the tooth makes its appearance. This pressure is not, however, uniformly exerted through the whole course of teething, but is divided into distinct periods or stages; as though the vital or instinctive principle, which is what we mean by nature, becomes exhausted by a certain extent of action, and then requires rest and a state of intermission. The first active stage of teething is usually about the third or fourth month of infancy; and constitutes what is called breeding the teeth, or the production of their bone from the pulpy rudiment, buried in the gum, and formed during foetal life, which at the same time shoots downwards, and gives to every tooth a neck and fang. The first and most usual symptom of this change, is the looseness with which the infant grasps the nipple, and the frequency with which it lets go its hold, accompanied with fretfulness and crying, and succeeded by a copious discharge of saliva, the salivary glands partaking of the irritation of the gums. Next, the uneasiness of the gums is found to be relieved by the pressure of any hard substance upon them which benumbs their excited sensibility; and hence the child is pleased with having its gums rubbed with the fingers, a coral, or a gold ring.

GEN. I.
SPEC. I.
α O. Dentitionis Lactentium.
Milk teething.

First stage;
or breeding
the teeth.

This last is perhaps the oldest method, and it may be the best: for the experiments of Dr. Chrestien, of Montpellier, who has of late endeavoured to revive the old preparations of gold as a part of the materia medica, show sufficiently that this metal, in very slight quantities of some of its simplest forms, is peculiarly active, and a powerful exciter of those secretions which have a tendency to diminish irritation and subdue inflammatory action. He has proved before a committee of the Royal Academy of Sciences at Paris, that friction of the tongue and gums with not more than four grains of powder of gold produces sometimes a copious ptyalism, sometimes abundant alvine evacuations, and sometimes profuse perspiration.* Friction by the finger or any other means is sometimes condemned, as likely to render the gum callous, and consequently more difficult to be cut through; but, so far as I have observed, this idea is not supported by facts. In many respects, M. Lallemand has since confirmed Dr. Chrestien's observations.†

* Recherches et Obs. sur les Effets des Préparations d'Or. 8vo. Paris.

† Journ. Générale des Sciences Médicales, Août, 1822. Rousseau, in his *Emilius*, objects to rubbing the gums with hard substances, and refers to the instinct of other animals, which leads them to exercise their budding teeth, not on bones or stones, but softer substances. In accordance with this view, a stick of marsh mallows, or of liquorice root, a piece of wax candle, or a crust of bread has been recommended, instead of coral; and in France, they often dip the substance in honey, or a sweet decoction of barley. In some parts of Germany, children are frequently seen sucking a small bag, containing a mixture of sugar and spices, which is given to them whenever they are fretful. By keeping them quiet, the nurse is saved trouble; but the derangement of the stomach, likely to

GEN. I.
SPEC. I.
α O. Dentitionis Lactentium.
Milk teeth-ing.
Symptoms of irritation.

Second stage; or cutting the teeth.

Milk-teeth formed prematurely.

If the irritation become very considerable, the gums swell, the child grows still more fretful, and starts in its sleep; or, on awaking suddenly, there is heat, thirst, and other concomitants of pyrexia, with perhaps dulness or drowsiness; the bowels are affected, which is a common symptom, and a rash appears on the skin, usually the *red-gum*, and if the irritation extend to the muscles of the chest, there is a dry and troublesome cough. It is the opinion of Dr. Withers, as given in his treatise on asthma, that a cough during dentition never takes place but from primary affection of the respiratory organs: yet I have often seen this effect produced as evidently from mere sympathy, as increased flow of saliva, or looseness of the bowels. In about ten days or a fortnight, these symptoms subside; and though the infant may occasionally be teased with slight paroxysms of uneasiness, it generally passes on without much inconvenience till the arrival of the second stage, or period of cutting the teeth, which we may expect to take place between the seventh and the close of the ninth month, though sometimes this does not occur till a few months later.

This is the usual progress; but here, as in many other organs of the system, we sometimes meet with a singular precocity of action, and, at other times, with as extraordinary a hebetude: and hence, while it is no uncommon thing for an infant to be born with several of its milk-teeth already cut; a fact, which has in various instances occurred to my own observation, and is specially noticed by Helwig* and other writers; sometimes these teeth are extremely tardy in their appearance, and, in one instance, are said not to have been protruded before the child was ten years old.† [M. Dugès saw an example in which no teeth were cut till the age of eleven;‡ and Smellie refers to instances of much greater retardation, where persons were twenty-one or twenty-two years old when their teeth first appeared. The appearance of teeth at birth is sometimes alleged to be particularly frequent in infants born after the usual period§; but, such premature dentition is neither a proof of protracted pregnancy, nor yet of, what is also stated, a strong constitution in the infant, which is often unusually small, and does not thrive. We have, indeed, high authority|| for the observation, that perfectly ossified teeth are sometimes cut in the foetus of only six months.]

It is the opinion of Mr. Fox, that the premature teeth, which are usually the central incisors of the under jaw, are nothing more than the upper parts or crowns of teeth without the apparatus of fangs; that they have consequently a weak attachment to the gums, soon get loose, and produce a considerable inflammation in the

arise from so free a use of these sweet stimulating ingredients must be objectionable. See DENTITION, in the Cyclop. of Pract. Med. p. 518. — Ed.

* Obs. 28. Richard III., Louis XIV., and Mirabeau, seem to have been born with some of their teeth already cut; but the circumstance is common enough in all ranks of society. — Ed.

† Eph. Nat. Cur. Dec. II. Ann. IV. Obs. 28. In all probability these were really the permanent teeth and not the milk ones, as mentioned in the text. In such cases, Andral concludes, that the failure of the first dentition must be owing either to the non-existence of the germs, or else to the pulp, though developed as usual, not secreting the hard portion. Anat. Pathol. t. II. p. 260. — Ed.

‡ Dict. de Méd. et Chir. Pratique, t. VI. p. 221.

§ Manuel d'Anat., tom. II. p. 359.

|| Andral, Anat. Pathol. t. II. p. 260.

mouth of the child, as well as great inconvenience to the mother* : and he recommends, accordingly, that they may be immediately extracted. Speaking generally, this account may be correct ; but, as there are instances in which teeth of this premature growth possess fangs, and are perfect, it is better to wait before we extract them till some inconvenience arises which may call for their removal.

It is somewhat singular, that the natural growth of the first set of teeth does not seem to be varied, at least according to any general rule, by the degree of strength of the infant ; for weakly children often cut their teeth even more rapidly than those in robust health, though the reverse is perhaps more generally the case ; and hence the stimulus of irritation in the process of dentition very nearly keeps pace with that of healthy vigour.

At this time the gum is often extremely sensible, and, instead of being eased by the pressure of a hard substance, cannot endure the slightest touch. At the base, it is florid and distended, but paler and whiter at the edge or upper part, and when the tooth is on the point of protrusion, seems covered with a flat and whitish blister.

The other symptoms are a repetition of those just described, with a scabby eruption about the lips or head, erythematic inflammation behind the ears, and occasionally spasmodic movements of the mouth and jaws, convulsions, or epilepsy.

The grand point is here to moderate the local irritation. A diarrhœa, or full discharge of saliva, does this naturally, and hence these are favourable symptoms. And, if the former be too violent, or accompanied with griping, it should be merely corrected by magnesia or prepared chalk, [or rhubarb combined with ipecacuanha, or hydrargyrum cum creta. If the evacuations are fetid, blackish, or very pale, an occasional dose of calomel, to improve the intestinal secretion, should be given. In particularly obstinate cases, the cautious use of the compound powder of ipecacuanha, with minute doses of calomel, is sometimes adopted. If the milk seem to disagree, the nurse must be changed, and beef-tea, rice-milk, and arrow-root given. In many cases, small doses of quinine are useful auxiliaries ; but since a moderately lax state of the bowels lessens the risk of worse consequences from dentition, the practitioner should not be in too much haste to check the evacuations ; and probably, as Dr. Joy has observed, it should never be done, so long as the appetite, sleep, and strength continue unaffected.] If the bowels be confined, we must employ cooling laxatives ; and the discharge of a small quantity of blood from the gums in the first stage, by lancing them, will often afford effectual relief. If the symptoms of oppression or spasmodic action be severe or incumbent, as drowsiness, difficulty of breathing, stertor, or irregular motion of the jaws, antimonial emetics and leeches should be had recourse to, and occasionally repeated ; after which, blistering will be found useful behind the ears, or on the back. And when the bowels have been thoroughly emptied, the use of anodynes may be allowed, and will generally prove highly serviceable ; though they should be employed with great judgment, and never intrusted to nurses. Hyoscyamus, in most of its forms, has often succeeded

GEN. I.
SPEC. I
α O. Denti-
tionis Lac-
tentium.
Milk teeth-
ing.

Symptoms
of irrita-
tion.

General
treatment.

* Hist. of the Teeth, p. 6.

GEN. I.

SPEC. I.

α O. Dentitionis Lactentium. Milk teeth-ing.

Lancet, when useful in the second stage.

Rubefacients.

β O. Dentitionis Puerilis. Permanent teething.

here, as well as in adult tooth-ache, when judiciously administered.*

In the second stage, or when the teeth are on the point of protrusion, the lancet will often afford immediate relief, not by a discharge of blood, for the upper part of the gum is now become so thin and wasted that little or none will follow; but, by giving a direct opening to the tooth, which will frequently make its appearance in the course of a few hours. It is singular, that the use of the lancet should be objected to so generally. The tooth is imprisoned by a membrane that surrounds it on a full stretch, and that is in a state of inflammation. Lancing the gum, or rather the inflamed membrane below the gum, takes off the tension, and sets the tooth free. The pain is slight and transient, and by no means to be compared with the permanent uneasiness, which the operation undertakes to relieve. It has been conceived, that a tough indurated cicatrix will be formed if the divided edges of the gum should unite after the lancet has been applied. Yet, in the spongy texture of this organ, no such effect is found to follow; but, on the contrary, the recently united edges of the gum, as in all other parts, far more easily give way to the process of absorption, than they would otherwise have done; by which means, the passage of the tooth is facilitated.

As the erythematic inflammation, which occasionally takes place behind the ears, proves often useful as a revellent, it has also been found sometimes serviceable to imitate it by a friction with savin ointment, or other rubefacients. But I cannot advise that this or any other eruptions, when produced naturally, should be suffered to run their course without restraint: for I have often known them become a worse evil than the original disorder. In this case, they should unquestionably be exchanged for some other more convenient discharge.†

In cutting the SECOND OR PERMANENT SET OF TEETH, it is not often that much uneasiness is encountered; for, firstly, their progress is much slower than that of the shedding-teeth; and, next, the constitution, with the acquisition of a greater degree of strength, is at this time become much less irritable. In a few cases, however, they push forward too rapidly, and urge the shedding-teeth against the superincumbent gums so forcibly as to excite considerable pain; and here a free application of the lancet affords the speediest and most

* Amongst other means, the warm bath, or pediluvium, and opiate frictions on the spine, deserve to be mentioned: the latter are sometimes preferred to narcotics by the mouth. — ED.

† The principal disorders accompanying dentition are imputed by Dr. John Clarke, in his commentaries on the diseases of children to plethora from over-feeding, and to the head being kept too warm. In fact, painful dentition itself brings on a great determination of blood to this part of the body. Hence, Dr. Clarke, with the view of preventing bad effects, recommends us to wash the head daily during dentition with cold water, and, if a moderate salivation and lax state of bowels are not present, he directs the use of gentle aperients.

The chylipoietic and respiratory organs, the brain and nervous system, the skin and the lymphatics, are the chief seats of the sympathetic affections occasionally induced by dentition. The best description of a spasmodic affection of the glottis, excited by dentition, is that by Dr. Marsh, in vol. v. of the Dublin Hospital Reports. For an account of a peculiar swelling of the backs of the hands and feet, occasionally brought on by the same cause, consult the writings of Underwood and Dr. Kellie of Leith. — ED.

efficacious relief. And not unfrequently the permanent teeth ascend with great irregularity, and press against the crown or fangs of those above them in erroneous directions; whence another source of considerable pain. In this case, the best and indeed the only radical cure is to extract the upper or cutting tooth, and thus allow freedom to the under tooth to right itself.*

[The milk-teeth occasionally continue in the jaw long after the common period of their being shed; and, as this circumstance does not necessarily prevent the permanent ones from being cut, the jaw seems at first really to contain a preternatural number of teeth; but, in most instances of this kind, the appearance of the permanent teeth is retarded, or they are even wanting, a circumstance fully accounting for the anomaly of the extraordinary continuance of the others.† The permanent teeth occasion the falling out of the milk ones principally by destroying by their pressure the vessels and nerves of the latter, as well as their adhesion to the alveoli. The destruction of the fangs is not an invariable effect, as the milk-teeth, when they are shed, sometimes have those parts very perfect.‡]

In the formation, and especially in the cutting, of the third set, or WISE TEETH, we ordinarily meet with a far more considerable degree of pain and inconvenience, and this too for many weeks; and the pain spreads by sympathy to the ear, which is often more affected than the tooth itself. Such is especially the case where the formation takes place late, and after the jaw-bones have ceased to grow, and the gum has become thick and callous; for we have here a want of sufficient room, and little power of enlarging it by absorption. In the upper jaw, moreover, the tooth on each side is frequently obliged to incline backward, by which means it presses on the anterior edge of the coronoid process in shutting the mouth, which causes an additional degree of uneasiness; while, in the lower jaw, some part of the tooth continues to lie hid under the coronoid process, and the portion of the gum that covers it is perpetually liable to be squeezed by the tooth below, and the corresponding tooth in the jaw above. In this case nothing but a very free crucial opening will suffice; and often nothing but an excision of a very considerable piece of the callous gum: while there are other instances, in which the evil can only be cured by removing the tooth itself.

We sometimes, though rarely, meet with playful attempts on the part of nature to reproduce TEETH AT A VERY LATE PERIOD OF LIFE, and after the permanent teeth have been lost by accident or natural decay.

This most commonly takes place between the sixty-third and the eighty-first year, or the interval which fills up the two grand climacteric years of the Greek physiologists; at which period the constitution appears occasionally to make an effort to repair other defects than lost teeth, on which we shall have occasion to treat more at large, when describing that variety of decay, which in the present system is denominated climacteric.§

GEN. I.
SPEC. I.
β O. Dentitionis Puerilis.

Permanent teething.

γ O. Dentitionis Adultorum.
Adult teething.

δ O. Dentitionis Senilium.
Climacteric teething.

* De l'Arrangement des Secondes Dents, ou la Méthode Naturelle de diriger la deuxième Dentition, &c. par M. Duval Broch, 8vo. Paris, 1820.

† Meckel, Manuel d'Anat., tom. iii. p. 359.

‡ Serres, op. cit. p. 102. § See Class III. Ord. IV. Gen. III. Spec. 2.

GEN. I.
SPEC. I.
δ O. Dentitionis Senilium.
Climacteric teething.

Examples of singular reproductions.

For the most part the teeth, in this case, shoot forth irregularly, few in number, and without proper fangs; and even, where fangs are produced, without a renewal of sockets. Hence they are often loose, and frequently more injurious than useful, by interfering with the uniform line of the indurated and callous gums, which, for many years perhaps, had been employed as a substitute for the teeth. A case of this kind is related by Dr. Bisset of Knayton, in which the patient, a female in her ninety-eighth year, cut twelve molar teeth, mostly in the lower jaw, four of which were thrown out soon afterwards, while the rest, at the time of examination, were found more or less loose.*

In one instance, though never more than in one, Mr. Hunter† witnessed the reproduction of a complete set in both jaws, apparently with a renewal of their sockets. "From which circumstance," says he, "and another that sometimes happens to women at this age, it should appear that there is some effort in nature to renew the body at that time."

He alludes to a restoration of the catamenia, and to the climacteric change, which we shall have occasion to notice hereafter. The author of this work once attended a lady in the country, who cut several straggling teeth at the age of seventy-four; and at the same time recovered such an acuteness of vision as to throw away her spectacles, which she had made use of for twenty years, and to be able to read with ease the smallest print of the newspapers. In another case that occurred to him, a lady of seventy-six, mother of the late Henry Hughes, Esq. printer of the Journals of the House of Commons, cut two molares, and at the same time completely recovered her hearing, after having for some years been so deaf as to be obliged to feel the clapper of a small hand-bell, which was always kept by her, in order to determine whether it rang or not.

The German Ephemerides contain numerous examples of the same kind; in some of which, teeth were produced at the advanced age of ninety, a hundred, and even a hundred and twenty. One of the most singular instances on record is that given by Dr. Slade‡, which occurred to his father; who, at the age of seventy-five, reproduced an incisor, lost twenty-five years before; and at seventy-seven reproduced another to supply a similar vacancy, so that at eighty he had hereby a perfect row of teeth in both jaws. At eighty-two they all dropped out successively; two years afterwards they were all successively renewed, so that at eighty-five he had once more an entire set. His hair at the same time changed from a white to a dark hue; and his constitution seemed in some degree more healthy and vigorous. He died suddenly, at the age of ninety-nine or a hundred.

Sometimes these teeth are reproduced with wonderful rapidity; but, in such cases, with very great pain, from the callosity of the gums, through which they have to force themselves. The Edinburgh Medical Commentaries§ supply us with an instance of this kind. The individual was in his sixty-first year, and altogether toothless. At this period, his gums and jaw-bones became painful,

* Edin. Med. Comment., vol. viii. p. 373.

† Nat. Hist. of the Teeth.

‡ Phil. Trans., vol. xxvii. year 1713.

§ Vol. iii. p. 105.

and the pain was at length excruciating. But, within the space of twenty-one days from its commencement, both jaws were furnished with a new set of teeth complete in number.

The jugglers on the Continent, a century or two ago, were in the habit of taking advantage of this occasional playfulness of nature, and offering, as natural phenomena in the formation of teeth, singularities which nature never dreamed of. Thus, a boy was at times started and hawked about the country with a golden tooth, much to the astonishment of both the learned and the unlearned; for though the tooth was in reality a natural one, and only covered over with an inlay of gold, yet the gilding was in one or two instances so exquisitely effected as to deceive almost every spectator, when the trick was first brought forward, and to lay a foundation for no small number of learned descriptions and profound explanations upon the subject.*

GEN. I.
SPEC. I.
δ O. Dentitionis Senilium.
Climacteric teething.
Pretended reproduction by jugglers.

SPECIES II.

ODONTIA DOLOROSA.

TOOTH-ACHE.

ACUTE PAIN IN THE TEETH OR THEIR INVOLUCRES.

THERE is often a considerable degree of pain of a particular kind that accompanies the irritation of the last species: but it is rarely, if ever, of an acute character; and is rather a sense of soreness about the tooth than an ache within it: and hence the definitions now offered are sufficiently distinct.

GEN. I.
SPEC. II.

Pain of this kind may be produced by various causes, as a catarrh, or cold; an exostosis or deposit of earthy matter on the sides of a tooth or its socket; a caries or decay; a peculiar affection of the nerves of the sockets or jaw-bone, acting upon a tooth by contiguous sympathy, and hence not relieved by extracting the tooth that is suspected. It may be produced also by some remote influence, as that of pregnancy, or sordes in the stomach; by a peculiar diathesis, as that of rheumatism, or scurvy; by the long use of mercury; or by a transfer of action, as in some cases of gout, in which the pain is often most vehement and agonising, and in various instances has produced convulsions, and in others delirium; or, in the language of the sufferers themselves, has actually driven them mad. In several of these cases, it occurs as a mere symptom of some other disease; and can only be cured by a removal of the disease that gives rise to it. The following varieties, however, seem well worth attending to, and will generally be found to result from a primary affection:

Causes.

* Horstius, De Aureo Dente, Lips. 1695, 8vo. Ingolstetter, De Aureo Dente Silesiaci Pueri, Lips. 1695, 8vo. Tytkobsky, Disquisitio duorum Puerorum, unus cum Dente Aureo, alter cum Capite Giganteo, in Lituania visus. Olivæ, 12mo.

| | | |
|-----------------------------------|-----------------------|---------------------------------|
| GEN. I. | α Catarrhalis. | From cold. |
| SPEC. II. | Catarrhal tooth-ache. | |
| α O. Dolorosa Catarrhalis. | β Cariosa. | From decay or caries. |
| | Carious tooth-ache. | |
| From cold. | γ Exostosa. | From ossific deposit. |
| | Nodose tooth-ache. | |
| | δ Nervorum. | From irritability of the dental |
| | Nervous tooth-ache. | or adjoining nerves. |

Every tooth has an internal cavity which commences at the point of its fang, and enlarges as it ascends into its body. This cavity is not cellular or rugged, but smooth on its surface: it contains no marrow, but appears to be filled with blood-vessels, accompanied with nerves which must necessarily be derived from the second and third branches of the fifth pair, though they have never been distinctly traced. In the interior of this cavity the teeth appear to be peculiarly sensible; and hence direct or indirect EXPOSURE TO THE EXTERNAL AIR; or, in other words, a carious opening, or a current of sharp air without such opening (for the air seems in many instances to act through the substance of a sound tooth), will produce acute pain, and is, in fact, the common cause of tooth-ache. The pain thus produced will sometimes cease very suddenly, and especially upon the application of an opiate, or some acrid essential oil. But the irritation is often communicated to the periosteum of the tooth, and thence to the membrane that lines the socket, which is only a duplicature of it. And hence, the pain will often become permanent from inflammation excited in these tunics, now thickened and tense, and at the same time incapable of relieving themselves by stretching; while if a rheumatic or gouty diathesis prevail, the pain may become intermittent or periodical.

Treatment. In all these cases, wherever we can trace in the tooth a hole opening externally, the readiest and most effectual modes of cure will consist in stopping up the hole with a metallic or some other substance, so as to defend the tooth from the access of cold; or in destroying the affected nerve by caustics or cauteries, introduced through the hole itself. The pain may also be occasionally diminished by the application of opium or the more acrid aromatic oils, especially that of cajeput, which is a distillation of the leaves of *melaleuca leucodendron*, either directly to the nerve in the tooth, or to the extremity of those nerves in the skin, which are branches of the same pair. These medicines act by exhausting the sensibility of the nerve: and hence relief is procured by ammonia and rubefacients; or by a blister behind the ear of the affected side; by burning the edge of the helix of the ear; rubbing the cheeks with the *cerambix moschatus*, which possesses a vesicatory power nearly equal to that of the lytta; holding brandy or hot water in the mouth; or applying the sedative juices of the lady-bird or *coccinella septem-punctata*, as well as that of several other insects, to the tooth or gums after bruising them for this purpose between the thumb and fingers. The root of the *petiveria alliacea*, or guinea-hen weed, a very acrid plant, is employed for the same purpose by the inhabitants of Jamaica, who put a small plug of it into the diseased cavity.*

Irritants
generally.

* Trans. Stockh. Acad. 1644, p. 287.

So the mastication of various other aromatic or stimulating plants will often produce a similar effect, and especially those that at the same time rouse the salivary glands to increased action, as the bulbs of the alliaceous plants, the root of several of the seselis, particularly the *seseli vulgare*, the common hartwort or *laserpitium siler*, Linn.

Such masticatories, however, are chiefly of use in the tooth-ache produced by rheumatism, or where congestion has taken place in the neighbouring parts from inflammation of any other kind. The sensibility of the nerves may hereby, indeed, be in some degree exhausted, but it is the evacuation that principally affords relief. On this principle relief is also not unfrequently obtained by smoking or chewing tobacco, and, as Dr. Cullen conceives, by the use of camphor*; though the camphor and tobacco may partly operate by the sedative power they possess. As errhines promote the same secretion as sialagogues, these have also been frequently employed with considerable success, as well in tooth-aches as ophthalmies; in both which cases, however, preparations of asarum have generally been found to produce more alleviation than those of tobacco, which is the basis of our common snuffs. A local application of cantharides in powder or ointment is inconvenient, but the tinctura cantharidis may be often used effectually with little trouble; yet the most elegant form of this stimulant for the present purpose is that of the French Pharmacopœia, under the name of Oleum de Cantharidibus. It is made by digesting for six hours, with a gentle heat, one part of powder of cantharides in eight parts of olive oil†; the oil thus impregnated is to be filtered, and is then fit for use.

Electricity has also been tried, and occasionally with success. On the Continent, magnetism has been a still more favourite remedy; and has at least more writers in its recommendation‡, whatever be the actual benefit it may have produced, of which I cannot speak from personal knowledge. Animal magnetism seems at one time, indeed, to have been very extensively employed for this as well as for other severe pains; and, if we may credit the writers of a century or a century and a half ago, with instant and specific effect.§ The grand magnetiser of the day was the then celebrated Valentine Greatrake, who operated by stroking his hands over the parts affected, much in the same manner as Mr. Perkins of America, not many years ago, employed his metallic tractors.|| And as strong emotions of the mind are well known to produce a more immediate influence on the tooth-ache, than on any other disease whatever, we may readily account for some of the cures hereby produced. Confident hope is as strong a stimulant as terror; and the latter is well known to operate so generally, that

GEN. I.
SPEC. II.
α O. Dolorosa Catar-
rhalis.
From cold.

Mastica-
tories.

Oleum de
Canthari-
dibus.

Electricity.
Magnetism.

Animal
magnetism.

* Mat. Med. vol.ii. p. 304.

† Codex Medicamentarius, seu Pharmacopœia Gallica. Paris, 1818.

‡ De la Condamine, Journ. de Méd. tom. xxvii. p. 265. Glaubrecht, Diss. Analecta de Odontalgia, ejusque remediis variis, præcipuè Magneta. Argent. 1766. Teske, Neuer Versuch in Curirung des Zahnschmerzens vermittelst eines Magnetischen Stahls. Königsb. 1765-6.

§ Schelhammer, Diss. de Odontalgia tactu sedenda. Jen. 1701.

|| Stubbbs, An account of several marvellous cures performed by the stroking of the hands of Valentine Greatrake. Lond. 1666, 4to.

GEN. I.
SPEC. II.
α O. Dolorosa Catarrhalis.
From cold.
Stopping the carious opening.

it is a rare fact for a person to be actually suffering pain just before the operation of extraction.

The stopping of a carious opening in a tooth should only be attempted when there is no pain; for otherwise the pain will be increased by the introduction of a foreign body. The substances, chiefly employed for this purpose, are gum-lac, bees'-wax, sealing-wax, tin, lead, and gold. The metals, and especially tinfoil, are amongst the most useful, as they afford the best guard, and far less frequently require to be renewed. Yet none of them can be easily retained in cases where the opening is wider at the top than the bottom; and although attempts have been made to keep them in the proper situation by drilling a small hole through the sides of the teeth, and rivetting a proper pin into the metallic substance, they soon become loose, and admit air, food, and other acrimonious materials.

Fusible metal.

Mr. Fox mentions a compound metallic substance, as far better calculated to answer the purpose of a permanent plug, than any of the preceding. It is obtained by mixing several metals together, which, by the process made use of, become fluid at the temperature of boiling water; on which account it has been called fusible metal. It is supposed that this may in consequence be employed in a liquid state, and thus have an opportunity of striking, before it becomes cool, into all the ramifications of the carious part, so as to fill up the cavity completely, and form a fixture not easily to be detached.

Indissoluble earths proposed.

It has often occurred to me that some of the drying earths, employed as cements by our stone-masons, and which harden into an indissoluble plate or mass under water, might be used with more success for this purpose than any other substance; especially tufa or tuffwacke, as Schmeisser calls it, and tarras, which are compounds of iron, alumine, silix, and carbonate of lime. Introduced into the cavity of a carious tooth in the form of soft paste or mortar, they will easily dry and harden and adhere, and no moisture of the mouth will dissolve them.

Nerve stupefied or destroyed.

If these methods should not succeed, we may attempt a cure by endeavouring to stupify the nerve of the tooth by a frequent use of hot essential oils intermixed with camphor and opium, or we may destroy it directly by a hot iron. And if these methods fail, and the excision of the crown of the tooth, as practised by Mr. Fay with a pair of cutting forceps, should not be deemed advisable, the only alternative is extraction, which, however, should never be had recourse to till the above plans have been skilfully tried; for, first, the pain may proceed from an affection of the socket, and in this case the pain of tooth-drawing will have been incurred for no purpose; and, next, a carious tooth, whose nerve has been destroyed or rendered torpid, may be of very essential service, as well as ornament, for many years, perhaps through the whole of life. Yet if the caries be accompanied by inflammation in the surrounding parts, the tooth should be removed without loss of time; as the mischief may spread, and the adjoining teeth be hurt.*

Extraction of the carious tooth.

In extracting a tooth, a very troublesome hemorrhage will occasionally follow; sometimes profuse and of long continuance.

Hemorrhage how to be treated.

* Manuel du Dentiste, pour l'application des Dents artificielles incorruptibles, &c. Par C. Maury, 8vo. Paris, 1820.

Plater, Schenck, and others, have indeed given cases in which it has proved fatal.* [Mr. Blagden† recorded the particulars of one remarkable instance, in which the use of styptics, the actual cautery, a plug in the socket, and even a ligature on the carotid artery, failed to suppress the bleeding, which proved fatal a week after the removal of the tooth.] The best ordinary styptic is pressure with an elastic substance, as a piece of sponge covered with wax, touchwood, spunk, or some other spongy boletus, or a dossil of lint dipped in a strong solution of alum or sulphuric acid. I was not long ago requested to see a young man, who had been profusely bleeding from the gums and socket of an extracted tooth for five days without cessation, and without sleep, till his wan cheeks and faint emaciated frame seemed to indicate that he had scarcely any blood left in his vessels. He was so weak as to be incapable of rising from his bed or taking food; and his stools, from the quantity of blood he was perpetually swallowing, had all the appearance of a melæna. On opening his mouth I found it crammed full of lint wadding, one piece having every hour been added to another, without a removal of the preceding, lest the hemorrhage should be increased, whilst the blood in which the wadding was soaked, and which had remained in the socket and over the gums for so long a period, was become grumous, putrid, and intolerably offensive.

I first removed the whole of this nauseating load from the patient's mouth, and gave him some warm brandy and water to wash it with. I next directed him to take a goblet of negus with a little biscuit sopped in it, a part of which he soon contrived to swallow. The bleeding still continued: but, as I had no doubt that this proceeded entirely from a total want of power in the lacerated arteries to contract, I applied no pressure of any kind, but prescribed a gargle of equal parts of tincture of catechu and warm water; and the hemorrhage soon ceased.

It is not easy to explain by what means teeth become carious. Out of the body they are indestructible, except by very powerful chemical agents; and yet, in the opinion of many physiologists, they are nearly in the same state in the body as out of it; extraneous substances formed complete at first, without vascularity, growth, or interstitial action, and even destitute of absorbents.

In caries of the bones, observes M. Auzebi, the decayed part is thrown off, and gives place to a new growth: while, in the teeth, if the enamel be broken, and a caries commence, the carious part is never thrown off, as in the bones, but continues its progress through the parts adjoining; nor can any remedy we know of produce a separation between the part that is sound and that which is unsound. And we have hence, says he, a proof that there are no vessels in the substance of the teeth, and that they have a distinct conformation from other bones.‡ Not widely different was the opinion of Mr. J. Hunter, when composing his *Natural History of the Human Teeth*; an opinion drawn from the impossibility of injecting them,

GEN. I.
SPEC. II.
α O. Dolorosa Catarhalis.
From cold.

Caries, how produced.

Whether the teeth be an extra-neous body.

* Plater, Obs. Lib. III. p. 773. Schenck, Lib. I. Obs. 403. 405., p. 99.

† Med. Chir. Trans. vol. viii. p. 224.

‡ *Traité d'Odontalgie, où l'on présente un système nouveau sur l'origine et la formation des Dents, &c.* Lyons.

GEN. I.
SPEC. II.
α O. Dolo-
rosa Catar-
rhalis.
From cold.

the perfection in which they are produced at first, and their retaining their natural colour after so long a use of madder as food that all the other bones of the body have become thoroughly tinged with it. "But they have most certainly," says he, "a living principle, by which means they make part of the body, and are capable of uniting with any part of a living body; and it is to be observed, that affections of the whole body have less influence upon the teeth than upon any other part of the body. Thus, in children affected with the rickets, the teeth grow equally well as in health, though all the other bones are much affected; and hence, their teeth being of a larger size in proportion to the other parts, their mouths are protuberant." Cuvier, who has adopted all Mr. Hunter's views, has employed the same reasoning*; and M. de Blainville has apparently gone beyond both; for he has denied not only a vascular structure, but even a living principle to the teeth.†

Authorities
in support
of this opi-
nion.

Mr. Fox, however, is said to have succeeded in injecting both the external and internal layer of the dental germ, and even Mr. Hunter himself appears to speak with some degree of hesitation in the treatise before us; and in his subsequent work "On the Diseases of the Teeth," offers observations that seem to show he had at that time embraced a different opinion. In the first essay, indeed, he allows that "the fangs of teeth are liable to swellings, seemingly of the spina ventosa kind, like other bones;" but he immediately adds, that "there may be a deception here, for the swelling may be an original formation." Yet, in the second essay, he treats of this swelling as one of the diseases to which the teeth are perpetually liable; he regards the teeth as subject to the common inflammation of other bones, and, like other bones, evincing at times, great sensibility through the entire substance of the organ, as well as in the central cavity itself.‡

Possess
an internal
action.

Probably some internal action is continually taking place in the teeth, though we are not able to trace it very evidently. The chief causes of a caries are undoubtedly external, but it may be sometimes produced by an internal cause. We have already noticed exposure to currents of cold air, and the medical practitioners of Germany and the north appeal to the opposite extreme of the habitual use of hot aliments, as a still more general and mischievous source of the same evil. In the Swedish *Amœnitates Academicæ* § we have an elaborate examination of this subject by M. Ribe, who tells us, among other things, that "man is the only animal accustomed to hot foods, and almost the only animal affected with carious teeth." Whence the author takes occasion to condemn, in an especial manner, the custom of drinking hot tea and coffee; and, in accordance with this remark and recommendation, M. Tillæus, another celebrated writer in the same interesting journal, tells us, from Kalm, in his paper entitled *Potus Theæ*, that the Indians of North America knew nothing of the inconvenience of carious teeth or debilitated stomachs till tea was introduced among them. There can be no question that the two extremes of heat and cold

Hot beve-
rages inju-
rious.

* Dict. des Sciences Médicales, art. DENTS.

† Nouveau Dict. d'Hist. Naturelle, &c. vol. ix. in verbo.

‡ At the end of this section the editor has introduced the chief arguments against the vascularity of the teeth.

§ Vol. vii. art. 136.

must be greatly, perhaps equally, injurious to the health; and as little, that the inhabitants of high northern latitudes must suffer more than others from the use of hot aliments, in consequence of the greater coldness of their atmospherical temperature.

To the abuse of hot beverages as a cause of caries, M. de la Salle adds the abuse or excessive employment of sugar; and seems to imagine, that these are the two principal means by which teeth are rendered black in their enamel, and carious in their substance.*

If sugar act at all, it must be by means of the principle of acidity which is contained in it; and, consequently, in proportion to the degree of affinity which this principle bears to the earthy matter or calcareous basis of the teeth and their enamel, beyond that of the acids which enter into their natural composition. And the same may be observed in respect to any other exotic acid whatever.

If, then, we examine the composition of teeth chemically, we shall find, that in their structure they consist very largely of phosphate of lime, with a small proportion of animal matter, and a much smaller of carbonate of lime; and in their enamel, which is altogether of the nature of ivory, that they consist almost entirely of phosphate of lime, with a small proportion of animal matter, and a minute trace of fluuate of lime. And, admitting that the same decompositions take place in an organised living structure, or a simply organised structure in a living frame, as when the principle of life has no concern, we have next to enquire whether there be any acids that have a stronger affinity for lime, than the phosphoric, for it is scarcely necessary to extend our research to the carbonic, since this can never be attacked till the enamel into which the phosphoric so largely enters be decomposed, and withdraws its protection.

Now, by examining the tables of elective attractions we shall find that there are four, and only four, acids that precede the phosphoric in their affinity for lime; the oxalic, sulphuric, tartaric, and succinic. We have daily proofs that the teeth, in the living subject, are greatly injured by the frequent or habitual use of several of these acids.† I have at this moment a lady under my care, who till of late possessed as sound and fine a set of teeth as can any where be boasted of. From a peculiar delicacy of constitution, however, it has been judged requisite that she should, among other medicines, use a very large quantity of sulphuric acid. This prescription has been continued for many months, and her general health is considerably established: but, owing to her not having taken all the precaution that is requisite to guard the teeth while swallowing the acid, the pearly enamel is becoming yellow, and its coating very considerably diminished in thickness, so that at the apex of the incisors it is almost as thin as a razor, and is frequently chipping off.

Sugar can have very little effect in destroying the enamel of a tooth; for, though it contain a principle of acidity, it cannot with propriety be regarded as an acid. It may give forth this principle

GEN. I.
SPEC. II.
α O. Dolorosa Catarhalis.
From cold.
How far sugar is injurious.

What acids chiefly affect the teeth.

Sulphuric acid.

Sugar not strictly an acid.

* Journ. de Méd. tom. xxxvii. appendix, p. 399.

† As the fluuate and carbonate of lime exist both in the bone and enamel of the tooth, and are even more abundant in the latter, than the former part, several acids, besides those specified in the text, must have an injurious effect on the teeth. — ED.

GEN. I.
SPEC. II.
α O. Dolorosa Catarhalis.
From cold.

by fermentation, in which case it will form acetous acid; or it may give forth the same principle by distillation with nitric acid, when it will form genuine oxalic acid (for that which exists already formed in the *oxalis acetosella*, or wood-sorrel, is precisely of the same kind); and, in this combination, will evince a stronger attraction for lime than any other acid whatever. But of itself, and without this combination, we have no reason to suppose that its action, if there be action at all, can be otherwise than extremely weak. [General de Beaufort ate a pound of sugar every day for forty years, and lived to the age of seventy. After death his teeth were found to be quite sound.* Plenck kept a healthy tooth in some diluted syrup two months, at the end of which time it had undergone no change.†] If sugar were a solvent of calcareous matter of any kind, it would first show itself in dissolving, and consequently preventing a lodgment of the carbonate, or phosphate of lime, which the salivary glands are so continually secreting, and which is perpetually incrusting on the neck of the teeth in mankind, and separating them from the surrounding gums; and hence sugar would be one of the best preservatives against such an encroachment. But as we do not find that those, who use a large quantity of sugar, are freer from this excrementitious matter, than those who abstain from it altogether, we have no reason to suppose that it is a solvent of the enamel of the teeth in any material degree.

Sugar.

Caution in the composition of dentifrices.

It will be well to bear these remarks in memory in the composition of dentifrices containing acids of any kind. For the reasons already assigned, the oxalic, sulphuric, and tartaric acids, ought at all times to be sedulously avoided; and hence cream of tartar, which enters so generally into their composition, should in like manner be rigidly proscribed; while those which have the least chance of doing mischief from their very slight affinity for lime, are the citric, benzoic, acetous, and boracic. Yet even these have a stronger attraction than the carbonic acid; and hence, whenever teeth are deprived of their enamel, or the naked fangs become exposed by a decay of the surrounding gums, these also must in like manner be abstained from.

How a caries operates.

By whatever means a decay or caries of the teeth may be produced, it appears to operate in three different ways; sometimes commencing in the internal cavity, and working its course outwards; sometimes commencing outwards, and working its course within; and sometimes by a wasting of the enamel, and consequent denudation of the bony part. The first, which is the least common affection (its reality being denied by several writers), is discoverable by an appearance of blackness within the whiter surface of the tooth; the third is often to be met with; but the second is the most frequent of the whole; evincing at its commencement the appearance of an opaque white spot through the enamel, which gradually crumbles away about the spot, and thus discloses that part of the body of the tooth which forms the original seat of the affection.

The disease, by its continuance, converts the spot into a hole, and at length destroys the tooth altogether, or at least down to its neck, unless the pain produced by the morbid progress compel the patient to have it extracted before the disease advances thus far.

* Anecdotes de Médecine, tom. ii. p. 35.

† Doctrina de Morb. Dentium, p. 52.

Caries of the teeth does not appear to be a disease of any particular age, or temperament, or state of health. It exists in infancy and in the firmest manhood, as well as in old age. In the last, indeed, the teeth, that drop out from absorption of their alveoli, are often as sound as when they were first formed; while in childhood it has sometimes spread from tooth to tooth so extensively, and at the same time produced so much torture, that it has been necessary to extract almost every tooth before the sixth or seventh year. Mr. John Hunter hence conceived, that a decay of the teeth was rather a disease of early, than of advanced life; and that the teeth did not become carious after fifty years of age. Mr. Fox, however, met with several persons, who had not only passed fifty years without having had a caries in this organ, but who had been obliged, after having arrived at sixty, to have several teeth extracted, in consequence of tooth-ache, produced by caries. In some general diseases of the constitution, the teeth seem to possess singular perfection and even luxuriance. Thus, in phthisis, it is almost a proverbial remark, that the white and pearly gloss of the enamel, which is peculiarly characteristic of soundness, is more than ordinarily clear and bright; while in rickets, in which the whole frame of the bones is shaken, and many of them become soft and spongy, the teeth ascend as firmly and as regularly, as if the system were in a state of the most vigorous health.

If the teeth be vascular, there is no great difficulty in conceiving that, like other bones, they may be subject to EXOSTOSIS, or a deposit of ossific matter on their surface, and particularly on the surface of their roots or fangs; [a case, which the non-believers in the vascularity of the teeth ascribe to original malformation. What is called an exostosis of the fang exhibits no irregularities on its surface, as other exostoses usually do; nor is its substance at all different from the rest of the fang. It is, in short, merely an accidental difference of form, where, as the offices of the part require no definite figure, variations in shape are quite common.*] The author conceives, however, that, whether the crown or body of the teeth be possessed of secretants in a mature state, they must have absorbents, since we behold their fangs, in very numerous instances, diminished, shortened, and truncated, and sometimes entirely carried away, which it is difficult to conceive can be done by the absorbents of any adjoining organ. And we may lay it down as a general rule, that there is no organ in possession of absorbent vessels, which does not at the same time possess secretants, so as to maintain a balance of action. We find, on extracting a tooth that has long been a cause of considerable pain, that the fangs at least are considerably encrusted with a deposit of ossific matter, so as to give it an appearance of that disease which was formerly but most incorrectly denominated a spina ventosa. And on examining the state of the alveoli after death, we find also that similar morbid apophyses have pullulated occasionally from the face of the alveoli.

Wherever such effects occur, whether in the alveoli or the teeth, a considerable degree of pain, and generally an increasing degree, must be the result, from the pressure of the bony pro-

GEN. I.
SPEC. II.
α O. Dolorosa Catarhalis.
From cold.
Common to all ages and temperaments.

Pearly gloss of teeth in phthisis.

β O. Dolorosa Exostosa.
From ossific deposit.

Teeth possess absorbents.

And hence most probably secretants.

Symptoms.

* See Rees's Cyclopædia, art. CRANIUM.

GEN. I.
SPEC. II.
β O. Dolo-
rosa Exo-
stosa.
From
ossific
deposit.
Treatment,

jections against the periosteum or alveolar membrane. At first this pain is not quite so acute as in carious or nervous tooth-ache, for the imprisoned tunic is not at this time in a state of irritation. But, by a continuance of the pressure, it is soon reduced to this state, when the pain will be as severe as on any other occasion, and far less mitidable.

Wherever we can satisfactorily decide upon the cause, and the complaint is recent, we may often put a check to it by a free application of leeches, and the local use of mercurial ointment, or a mercurial plaster. But in cases of long standing, the only cure is an extraction of the tooth; for even if the disease be seated in the socket, it will be instantly arrested by this process, as the substance of the socket, no longer of any use, will from this time be in a state of absorption, and be at length entirely removed.

γ O. Dolo-
rosa Nervo-
rum.
From irri-
tability of
the dental
or adjoin-
ing nerves.

There is sometimes a PECULIAR IRRITABILITY IN THE NERVES OF THE TEETH themselves, or of those parts by which they are immediately surrounded, and with which they participate in action, that excites the sensation of severe and even agonising tooth-ache, without caries or any other concomitant. In this variety, the exact seat of pain is less easily defined than in the preceding; and, there being no black spot or other external mark to direct us to it, the tooth is often mistaken in the continuous sympathy excited, and a sound tooth is extracted in its stead; so that the torture remains unabated. And there are instances, in which the plan of extraction has been followed up from tooth to tooth without any alleviation whatever, till the jaw has been entirely divested of its teeth on the disordered side.

This is often an idiopathic affection, dependent upon a peculiar irritability, from a cause we cannot easily trace, of the nerves subservient to the aching tooth, or the tunics by which it is covered, or the periosteum, or the fine membrane that lines the interior of the alveoli. But it is more frequently a disease of sympathy, produced by pregnancy, or chronic rheumatism, or disorder of the stomach, in persons of an irritable habit. For this remote or indirect influence it is not difficult to account, when we reflect that the great intercostal nerve, emphatically called the sympathetic, and connected by ramifications with every viscus of the chest and lower belly, is connected also, by its union with a branch of the fifth pair, with the nerves that immediately supply the teeth, and which hence become its indirect extremities.

Neuralgia
faciei mis-
taken for
tooth-ache.

It is still less to be wondered at that the nerves of the teeth should often associate in the maddening pain of *neuralgia faciei*, or tic douloureux; for here the connection is both direct and immediate. In consequence of this, the patient, in most instances, regards the teeth themselves as the salient point of pain (and they may unquestionably be so in some cases), and rests his only hope of relief upon extraction, although, when he has applied to the operator, he is at a loss to fix upon any one tooth in particular. Mr. Fox gives a striking example of this in a person from whom he extirpated a stump, which afforded little or no relief; in consequence of which his patient applied to him only two days afterwards, and requested the removal of several adjoining teeth which were perfectly sound. This he objected to, and, suspecting the real nature of the disease, he immediately took him to Sir Astley

Cooper, who, by dividing the affected nerve, produced a radical cure in a few days.

Where the pain, therefore, proceeds from sympathy, it is of the utmost importance to trace it home to the organ idiopathically affected, for to this the attention should be chiefly directed. Where it exists as a primary disease, it is often of long duration, and difficult removal. Sometimes narcotics, and sometimes stimulants, have been found most successful: blisters have occasionally relieved; and the burning of a little cone of moxa behind the ear, more frequently and more effectually. Of narcotics applied locally, hyoscyamus appears to be one of the best. Its seeds may be put to the cheek in the form of a cataplasm; or their smoke conveyed by a funnel to the tooth itself. In this last form, it will often allay the pain of a carious tooth. Where the pain is remittent or periodical, a free use of bark, with change of air, has proved most salutary.

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SPEC. II.
O. Dolorosa.

[From the preceding observations it appears that the author of the present work joins those physiologists who regard the teeth as vascular, and he even carried this belief so far as to express a suspicion, that these organs sometimes undergo an increase of size, whereby the interspace produced between two of them, by the extraction of one, may be considerably lessened. In a former edition of this book, he mentioned the fact as having occurred in his own jaw, after the removal of one of the bicuspidati, when he was a boy. That the teeth frequently approach each other, so as to lessen, and even nearly fill up, the interspace occasioned by the extraction of one of them, is an undoubted truth; but, the correct explanation of its cause is not the enlargement of the teeth, but the change that follows in the situation of the socket. Hence, when a tooth is removed from a young subject, whose jaw is yet growing, the interspace may become in time nearly obliterated. If the gap were filled up by the expansion of the adjoining teeth, this could only happen from the enlargement of the crowns; but though specimens of exostoses and swellings of the fangs of teeth are contained in museums, the editor has never yet met with a tooth, whose crown or body was enlarged.

Vascularity
of the teeth.

The question, whether the teeth are vascular, is extremely curious and interesting; and so unnatural is the idea of an harmonious connection between dead and living substances, that the common opinion of the teeth being furnished with vessels and nerves is not at all surprising. Nay, the excessive pain often seated in these organs, and the remote, diversified, and very severe disorders, which they appear to excite sympathetically in the animal economy, are circumstances presenting something like a confirmation of the doctrine. Nor can it be denied, that much difficulty occurs in accounting for certain changes in the teeth, unless this doctrine be admitted. But, it is not because we cannot explain precisely the nature of every particular alteration or appearance of these organs, without supposing them to be vascular, that they must really be so; for, if some of the phenomena in question take place also in artificial teeth, and in teeth which have been boiled, or kept so long in a drawer as not to admit of the suspicion of their being alive, the doctrine then immediately becomes a questionable hypothesis.

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SPEC. II.
O. Dolorosa.

The difficulty of accounting for caries of the teeth, and for the absorption of their fangs, unless the belief in the vascularity of these organs be adopted, seems to have had great influence in determining the author of the "Study of Medicine" to consider the substance of the teeth as vascular. That he was also correct in his notice of the disagreement between Mr. Hunter's Natural History of the Human Teeth, and the Essay on their Diseases by the same distinguished man, is a truth, of which no person who has read these works, can doubt. The subject was difficult, — so difficult as even to involve Hunter in hesitation, if not contradiction. Our author has not mentioned, however, some of the principal facts and arguments which such modern physiologists as disbelieve the vascularity of the teeth generally bring forward: a short account of them in this place may not, therefore, be uninteresting.

In the second edition of this work, it was remarked by the author, that, "admitting the soundness of Mr. Hunter's experiments, and the accuracy of his reasoning, it seems impossible that the teeth, when once perfectly produced in the gums, should ever decay; for no action of the living principle can occasion a secretion of those chemical agents which would alone, in such case, be capable of destroying them." We have seen, also, that our author describes one form of caries as beginning within the tooth. Others, however, deny the reality of the latter case, and if they are right, the answer is at once given to the foregoing argument. They distinctly allege that caries never begins within the tooth; but a speck is first seen upon the enamel, a portion of which being destroyed, the decay extends to the bone of the tooth, and proceeds from the surface into the cavity. As soon as the bone begins to be affected, the progress of the decay is much more rapid; an excavation is produced; and the enamel is left in the form of a hollow shell. The following considerations are mentioned as proofs, that the decay is not the effect of vascular action. It first attacks the enamel, which is confessedly not vascular; for though Bichat regarded this substance as sensible and organised, because acids set the teeth on edge, the fact is, that the disagreeable sensation, here adverted to, is not situated in the enamel itself, nor is it ever excited by an acid merely applied to it. The acid must at the same time come into contact with the organ of taste, or extend its action directly to the sensible parts within the cavity of the tooth.

Throughout the whole process of caries, there is no attempt at reparation. Artificial teeth are as much subject to decay as natural ones. The discoloration has, indeed, been sometimes thought to be more deep in the artificial teeth, made of the tooth of the hippopotamus, than in the human teeth; but, in engrafted human teeth, the decay is acknowledged to be precisely similar to that of the natural ones.*

The alleviation of tooth-ache by the application of muriatic acid, nitrate of silver, and other caustics to the carious surface, has been esteemed a proof, that the caries is an ulcer, and that its irritability may be destroyed by such treatment. Since, however, the remedies may act upon the exposed vascular contents of the cavity of the tooth, or may affect these contents by penetrating through the thin

* Rees's Cyclopædia, art. CRANIUM.

GEN. I.
SPEC. II.
O. Dolo-
rosa.

medium which remains, it is manifest that they can afford no proof of the point in question. At the same time, it is to be taken into the account, that tooth-ache from caries may frequently be relieved by a plan nearly amounting to a demonstration, that the pain does not arise from the ulcerated surface, but from the nerves in the cavity; namely, let the decayed hole be stopped up (which is rather a rude method of treating an irritable ulcer) so as to prevent the access of the external air, and of foreign bodies, and the pain will cease.

The writer, from whom the editor has borrowed these judicious reflections, further observes, that it is not perhaps so easy to determine what the decay is, as what it is not. Those, who consider the teeth as destitute of vessels, ascribe their decay to the chemical action of the secretions in the mouth, and of the articles of food. Here it is difficult to comprehend how a cause, which must necessarily be so general in its application, should be so circumscribed in its effects; never producing decay at once in an extensive surface, but in its commencement, limiting its action to a small spot. However, in artificial teeth, a large surface sometimes decays under circumstances favouring an accumulation of fluids in a particular part; viz. the portion that corresponds to the gum, and is usually grooved, and also the lateral parts of such teeth.

Various considerations strengthen the inference, that the decay of the natural teeth must depend upon a chemical and not a vascular operation. It commences in those situations where food or extraneous matters are most liable to lodge, as between the teeth, and near the neck, just where the gum adheres. It is checked by stopping up the hole, and preventing the entrance of the food and secretions of the mouth into it. It is most frequent in the higher classes of society, whose food is of the most unnatural and miscellaneous kind. It is very rare in the teeth of savages, and it is alleged never to occur in animals. In twelve or fourteen skulls, discovered in two barrows opened in Gloucestershire, not a single decayed tooth was noticed. Now, as this mode of burial has not been employed for the last six centuries, these skulls must have belonged to a time when the modern habits of luxury, in respect to food, were unknown; and when the effects of such habits on the teeth were, of course, not discernible.* One fact connected with the foregoing statements, and perhaps in some degree throwing a doubt on part of them, is the extraordinary prevalence of caries of the teeth in particular families, seemingly as if there were some original hereditary imperfection in them, whereby the causes of caries, whatever they may be, very readily produce their destructive effects. Another fact, universally acknowledged, is the frequent and almost regular occurrence of fine sets of teeth in certain families through a long series of years; a circumstance that seems, like the preceding one, to imply some hereditary differences in the degree of perfection of these organs. That persons who smoke tobacco generally have discoloured carious teeth is a fact universally recorded. Perhaps, therefore, the ingenious author of the present work was mistaken in supposing, that the production of caries of the teeth could not be

* Rees's Cyclopædia, art. CRANIUM

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O. Dolorosa.

chemically accounted for, unless the secretion of chemical agents within them were admitted as a fact, which fact would, of course, imply vascularity. The caries, instead of beginning sometimes internally, as he supposed, always commences externally in the enamel, and proceeds from it into the bone of the tooth, so that the fluids, and other matters in the mouth, have direct access to the affected surface. An inward decay of the teeth, with the whole shell of enamel perfect, is talked of by dentists; but, though the external aperture may be minute and concealed, its existence must not be denied, until a contrary case can be fully demonstrated.

Inferences
from ex-
periments
with
madder.

Our author supposed, that madder and anatomical injections might not be sufficiently attenuate to enter the vessels of the teeth, and was not disposed to receive the fact of those substances not entering them as a proof of their non-existence. Certainly, in several instances, to conclude that parts are not vascular, because the vessels cannot be injected, would be decidedly erroneous. But in these particular cases, the phenomena of disease enlighten us, and correct our judgment; which can hardly be said to occur with respect to the teeth, for their changes, whether vital or chemical, are enveloped in the deepest mystery. As for the experiments with madder, however, they furnish the strongest argument of all against the vascularity of the fully formed substance of the teeth, without even affording the least room for the argument, that madder is not subtle enough to enter the vessels of those organs. This will be immediately evident, when it is recollected, that while the tooth of a young animal is only partly formed, if madder be given with the food, it is really transmitted by the vessels of the pulp, not indeed to the portion of the tooth already complete and void of vessels, but, to that part of the organ which is developed subsequently to the beginning of the experiment, and is the work of the vessels of the pulp. Here, however, a most interesting fact was pointed out by Mr. Hunter; namely, that when the tooth of a young animal has thus been tinged with madder, the stain is never afterwards removed, which is exactly the reverse of what occurs in bones dyed by feeding animals with the same substance. The bones, therefore, must have vessels for the conveyance of the madder into them, and other vessels by which it is again removed from them. On the other hand, though the vessels of the pulp seem capable of communicating the red tinge of madder to the bone of the tooth, upon its first deposition, they appear directly afterwards to have no further communication with the new formation, which remains incapable of every change usually produced in other parts through the medium of arteries, veins, and absorbents.

These conclusions, deduced from experiments with madder, may be set down as firmly established, without being at all weakened by an observation made by the late Mr. Gibson; namely, that the fact of the power of madder to redden the bones is no demonstration, that a continual renovation of their particles takes place.* Madder communicates to the bones a red tinge, which is afterwards gradually removed: these two facts prove, at all events, an interstitial action, as far as that substance is concerned, and thus are explicable only on the principles of vascularity and life. Just so

* See Mem. of the Literary Society of Manchester, 2d series, vol. i. p. 146.

the communication of a red tinge by madder to the phosphate of lime of a tooth that is undergoing developement is a tolerably convincing proof, that vessels then deposit both the earthy and the colouring matter; while the permanency of the tinge as clearly shows that the coloured particles of lime in the tooth are not absorbed again, and that no vascular interstitial changes afterwards occur.

In confirmation of the preceding view, it deserves particular notice, that the teeth never exhibit any appearances of reparation, under circumstances of accidental injury or supposed disease. The loss of substance occasioned by the friction of mastication is not repaired; a part broken off is not renewed, but the fractured surface remains unchanged; a hole, caused by decay, is never filled up again. The union of a fracture near the neck of a tooth, even if it be possible, as M. Duval* and others declare, does not at all invalidate the foregoing statement, because the union is ascribed to the action of the pulp, and not to that of vessels within the substance of the tooth itself.

The non-existence of vessels in the teeth may be inferred from another particular case; a violent blow sometimes causes a general discoloration of a tooth, as if blood were effused through all its texture. This appearance is explicable, either by supposing vessels to exist in the substance of the tooth, which pour out the blood in consequence of the injury, or by supposing that the vessel in the fang is ruptured, and that the extravasated blood mechanically discolours the substance of the tooth. If the former explanation be adopted, the colour ought not to be permanent; for wherever there are arteries, there must also be absorbents; and these ought to remove the effused blood, as they do in bruises of the soft parts. By the other explanation, we gain a satisfactory solution of the difficulty; we account for the duration of the colour in the tooth in the same manner as of that which arises from feeding a young animal with madder.

The teeth are exempted from all those diseases which ravage the bones: lues venerea, scrofula, and rickets, which attack all other bones, never produce the slightest effect on the teeth, which remain unaffected even in cases of *mollities ossium*, where all the other earthy matter of the system is absorbed.† In short, the teeth never have the slightest participation in the general affections of the constitution. Their substance also never swells from inflammation; it never throws out a fungus or exostosis; for what has received this name is in all probability an original malformation, as Mr. Hunter first suggested.‡ Ossific depositions may be conceived

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SPEC. II.
O. Dolorosa.

No process of reparation in teeth.

Permanent discoloration of the teeth.

Teeth exempt from the diseases of bones.

* Dict. des Sciences Méd., tom. viii. p. 335.

† The museum at Leipsic, it is said, contains examples of ankylosis of the teeth with the jaw, taken from rachitic subjects, and likewise other preparations illustrative of the fragility of the teeth in individuals of a similar constitution. (Cyc. of Pract. Med., art. DENTITION.) But it appears to me, that as fragility of the teeth is by no means common in rachitic patients, and is sometimes observed in other persons, it can hardly be regarded as an unequivocal effect of rickets.—ED.

‡ Soemmerring and Fox each saw a case, where several of the teeth were consolidated into one mass; and Dr. Joy met with a similar instance in the Museum at Leipsic of two incisors grown together by their crowns, while the roots were separated. These abnormal appearances, he refers to the deficient evolution of the alveolar septa. (Cyclop. of Pract. Med., art. DENTITION.) In speaking of Odontia Deformis, we shall introduce some other explanations of this point.—ED.

GEN. I.
SPEC. II.
O. Dolorosa.

Teeth separated with exfoliations, unaltered.

Differences in the growth of teeth and bone.

Argument from blood being sent into a tooth.

From yellow colour of the teeth in jaundice.

to arise from the vessels of the pulp, or those of the membranous lining of the fang, so as to lessen, or even obliterate, the cavity or canal; a change said to happen in old age, without supposing any part of the change to result from vessels in the substance of the bone. The same substance never exfoliates. Whole teeth are sometimes included in an exfoliated portion of the jaw; but then they are not altered in structure or appearance, which is another proof of their want of vascular connection with the rest of the body. If, says a well-informed writer, it be said that these teeth are dead, like the bone which contains them, we would ask, what are the distinctions in appearance between a dead and a living tooth? Are they to be ascertained by inspection in the living body, or can they even be demonstrated by anatomical investigation? The absorption of the fangs of the temporary teeth cuts off the vessels long before these teeth are actually shed; yet there is no sign, nor character, by which a tooth, whose vascular supply is thus intercepted, can be distinguished from another in which it remains unimpaired.*

As is remarked by the same author, the difference between the growth of the teeth and that of the bones is particularly striking. In the cartilaginous epiphysis of a young bone, vessels are seen entering from all sides; in the centre there is a small bit of bone, of a loose and spongy texture, which can be made quite red by injection. We can trace this hardening, through every intermediate stage, to that of perfect bone, the vessels of which, even in its most compact state, are still easily demonstrable. Let us compare with this the growth of a tooth. If we examine it at ever so early a period, when a speck of ossification only can be discerned, the part which is thus formed is complete, and has all the properties which belong to the bone of the perfect tooth. It does not undergo that gradual developement which is seen in the growth of bones; but the smallest point, when once formed, never alters. In cartilaginous epiphyses, the central portion of bone is imbedded in the cartilage: numerous vessels can be traced into it on every side: while in a tooth, the ossification does not go on in the centre of the pulp, but the bone covers it like a shell. The connection between them is merely that of contact of surface, and there is no discoverable vascular union.

If any argument be drawn in favour of the vascularity of the teeth, from the fact of blood being sent into their cavity, it must be immediately weakened by the reflection, that the intention of various other arrangements in the structure of the body is completely mysterious. Thus, we know as little why male animals have mammae and nipples, as why the cavity of a tooth should contain vessels apparently for no purpose.

With respect to the circumstance of a yellow colour being communicated to the bone of the teeth, in jaundice, it is no proof of their vascularity. As is well remarked, the argument would prove too much. The vessels of the teeth, if any such exist, are so minute that they neither convey red blood nor coloured injection; yet they are capable of carrying so much bile, as to tinge the tooth of an uniform yellow to a certain distance from the

* Rees's Cyclopædia, art. CRANIUM.

cavity. If this colour be then owing to a yellow fluid, contained in vessels, these must be so numerous as to render the tooth much more vascular than any other bone. The fact is, that the vessels of the pulp contain bile, and dye this part of an uniform yellow colour, which is mechanically imparted to the adjacent bone in the neighbourhood of the cavity; the effect gradually ceasing at a little distance from it. The stain is produced, just as it is by immersing the teeth in bile after death.

Another proof of the vascularity of the teeth is attempted to be taken from their successful transplantation from the jaw of one person to that of another, or to parts of another animal's body, as the comb of a cock. These experiments, however, will succeed with dead teeth. The writer of the article CRANIUM in Rees's Cyclopædia was shown a cock, in whose comb the late Mr. Moor, the dentist, had inserted a tooth that had previously lain many months in a drawer; and it was firmly adherent. This adhesion then does not seem to require even the living principle, of which it was regarded by Mr. Hunter as a proof.

But no arguments have been more confidently employed by the believers in the vascularity of the teeth, than those deduced from comparative anatomy. Animals of the class glires, as the beaver, hare, rabbit, squirrel, rat, mouse, &c. have two very large incisor teeth in each jaw, which, being employed in cutting various hard bodies, wear down very rapidly. Hence, if these animals be kept entirely on soft food, their teeth grow out to a great length, and sometimes assume very ludicrous shapes: and if these teeth be lost from one jaw, the opposite ones grow out in the same way.* This constant growth is effected in the same manner as their original formation. They are hollow, and contain a pulp, which continues to deposit fresh substance below, in proportion as their upper part wears away. The tusks of the elephant and hippopotamus have a similar power of growth.† It seems now, indeed, to be the common belief of some of the first physiologists, that the teeth really present a strong analogy in their developement to the hair, nails, and horns of the animal body, and also, as M. Geoffroy St. Hilaire has fully ascertained, to the beaks of birds. In the human subject, the process by which the teeth are formed confirms this doctrine; but, as we have noticed, what happens in the incisor teeth of the gnawing animals is a still closer analogy, since the pulp retains for an indefinite period the power of secreting additional matter, by which the effects of the loss of the tooth at its cutting end are

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SPEC. II.
O. Dolorosa.

From their
transplantation.

From the
growth of
the incisors
in the
glires.

Analogy
between
teeth and
horns,
nails, &c.

* This remarkable growth is sometimes the consequence of a mere change in the direction of the teeth, without any of them being absent. In the head of an old rat, presented to the Royal Academy of Medicine, Andral noticed the following disposition of the incisors. The upper right incisor had scarcely shown itself out of its socket, when it inclined obliquely downwards and backwards into the mouth; and, having reached the posterior opening of the nasal fossæ, it turned upwards and entered the left cavity of the nose. After reaching the nostril, it next perforated the upper jaw-bone, insinuated itself into the socket of the adjoining incisor tooth, and now changing its course again, terminated in a point below the left orbit. The two incisors of the lower jaw were also curiously lengthened and twisted; and one of them, after passing close to the left eye, which it had destroyed, came in contact with the skull, and seemed ready to pierce it. Anat. Pathol., t. ii. p. 266. — ED.

† See Rees's Cyclopædia, art. CRANIUM.

GEN. I.
SPEC. II.
O. Dolorosa.

Explanation of the cause of the imbedded state of bullets sometimes found in elephants' tusks.

Absorption of fangs no proof of vascularity of the teeth.

counteracted, and an incessant tendency to elongation, or growth, kept up in the organ. A list of distinguished authorities, and a brief notice of some of the arguments in support of this physiological view of the nature of the teeth, are given by Meckel.*

Bullets have been found imbedded in the tusks of elephants. Now, the advocates for the vascularity of the teeth have argued, that the closure of the opening, by which the ball entered the tusk, and the swelling sometimes observed in these cases opposite the foreign body, could not have taken place without the agency of vessels. However, these occurrences are now satisfactorily explained, without having recourse to this hypothesis. The tusks are constantly growing during the animal's life, by a deposition of successive laminae within the cavity, while the outer surface and the point are gradually worn away; and for this purpose the cavity is filled with a vascular pulp, similar to that in which the teeth are originally formed. If a ball penetrate the side of a tusk, cross its cavity, and lodge on the opposite side, it will become covered towards the cavity by the newly deposited layers of ivory, while no opening will exist between it and the surface to account for its entrance.† All the various appearances, attending the lodgment of bullets, and pieces of other weapons, in the tusks of elephants, can be accounted for by the power of the pulp connected with these organs.

The absorption of the fangs of teeth is no proof of absorbents in them, the fact only showing that those parts are capable of being acted upon by the organs of absorption, which may be situated in the alveoli, or in the cavities of the fangs, without being actually in the substance of the bone of the tooth.]

SPECIES III.

ODONTIA STUPORIS.

TOOTH-EDGE.

TINGLING UNEASINESS OF THE TEETH FROM GRATING SOUNDS
OR FRICTIONS.

GEN. I.
SPEC. III.

THERE is sometimes a peculiar sensibility in the teeth or their sheaths that induces a kind of vibratory pain, in which they are colloquially said to be SET ON EDGE; and that in two ways, as follows:—

α A stridore.
β Ab acritudine.

From jarring noises.
From vellicative or acrid substances.

α O. Stuporis à stridore.
From jarring sounds.

In many cases, the teeth sympathise with the ear, on an exposure to harsh, dissonant, or stridulous sounds, as the grating of

* Manuel d'Anat. tom. iii. p. 357. See also Mém. sur l'Accroissement continué et la Réproduction des Dents chez les Lapins, &c. par M. Oudet, in Magendie's Journ. de Physiol., tom. iii. et iv.

† See Rees's Cyclopædia, art. CRANIUM.

a file, the creaking of a door on its hinges, or of a swinging sign in the street.

The same effect is produced whenever the teeth are vellicated by smooth substances, as a piece of silk or velvet, or exasperated by acid or other acrid materials.

To explain these effects, it is necessary to observe, in the first place, that a close reciprocity of feeling is at all times maintained between the teeth and the tympanum of the ear, by a union of their respective nerves; as one of the branches of the seventh pair, destined to supply the tympanum, anastomoses with the lingual branch of the fifth, which sends offsets to the teeth: by which means the latter become indirectly an organ of sounds, as well as of mastication. It is for this reason, among others, that deaf persons open their mouths to catch up speech they cannot otherwise hear; and that, as already observed, when the wise or adult teeth are about to be cut, the tympanum not unfrequently endures more pain than the gum or membrane by which the tooth is covered; and hence, the tuner of a musical instrument is often in the habit of applying his tuning-pipe to his teeth, as soon as he has put it into a state of vibration, to determine the more accurately upon its pitch.

Now, as the last action is a source of pleasure to the teeth, from the vibrating tone proving agreeable to the ear, we can readily see why tones or sounds of any kind that are hateful to the ear should be hateful also to the teeth.

This is the general principle: and it is sufficient to explain, why all persons are in a certain degree subject to the tooth-edge upon an exposure to the more common causes that produce it. But, in constitutions of a peculiar kind, or where the ordinary association between the two organs has been specially and habitually cultivated, or some early and very powerful impression has been even accidentally communicated from the one to the other, the sensation of tooth-edge will be produced far more frequently and acutely than in other cases. And when, in such persons, the teeth are in a state of preternatural sensibility from any kind of diseased action, or from irritating substances applied to them and the gums, as acerb or acid juices, the sensation may become so acute as to be intolerable. Bartholine has recorded a case, in which the sharpening of a knife so highly excited not the teeth only, but the surrounding gum, that, along with a very sensible jarring of the teeth, a profuse hemorrhage from the gum was occasioned.*

In many instances, the power of the imagination alone, from a long habit of association, is sufficient to call up a very considerable degree of this painful feeling†; as when we see a knife drawn across a china-plate, though so gently as to produce no sound whatever; and there are instances of persons in a high degree of excitement, who, by this action alone, have been suddenly thrown into convulsions.

While this affection is permanent, or very frequent and troublesome, and proceeds from a morbid state of the teeth or their involucres, our attention must be particularly directed to the nature of

GEN. I.
SPEC. III

β O. Stupor ab acritudine. From vellicative or acrid substances.

Cause explained.

Case accompanied with hemorrhage.

Sometimes produced by imagination.

Mode of treatment.

* Epist. IV. p. 523.

† Darwin, Zoonom. sect. xvi. 10. and class iv. 1, 2, 3.

GEN. I.
SPEC. III.
O. Stupor-
Tooth-
edge.

the cause with a view to its removal: if the gums be inflamed, spongy, or otherwise irritable, scarification will often be found serviceable: and if the disease be seated in the body of the teeth, several of the remedies, recommended under the preceding species, may have an equally good effect in the present case. If it be a symptom of some other complaint, it can only be removed by a removal of the original disorder. Forestus*, Baricelli†, and others assert, that relief may often be obtained by chewing purslane leaves. When it is the mere result of an association of ideas, or of great strength of sympathy, with an ear delicately alive to harmony of sounds, it is best cured by an habitual exposure to the cause of the affection, which gradually blunts the feeling. The grating sound, produced by filing a saw, was probably at one time harsh and abhorrent to the ears of the sawyer; but, by being inured to it, he at length hears it with indifference.

SPECIES IV.

ODONTIA DEFORMIS.

DEFORMITY OF THE TEETH.

TEETH IRREGULAR IN SHAPE, POSITION, OR NUMBER.

GEN. I.
SPEC. IV.
How produced.

Deformity
of the teeth.

DEFORMITIES of the teeth are for the most part produced naturally and in early life. Either set may be too large or too small, or some of them much larger or smaller than the rest, or they may be irregular in their line of ascent. They may be misplaced by incurvation, or projection, or obliquity. They may be crowded and confused, or, as has sometimes occurred, be multiplied in crops of double or triple rows.‡ In all these cases, they cannot too soon become a subject of artificial arrangement, which in young persons may accomplish much, and often, by skilful management, not only correct the error of shape or number, but give a proper inclination, not merely to the teeth, as they start from their natural line, but even to the misshapen sockets.

Calcareous
matter
often ex-
cessive or
deficient.

Many of these irregularities proceed from a natural excess or deficiency of the calcareous matter, which enters into the structure of the teeth. This has been sometimes so defective as to leave the teeth cartilaginous, or possessed of their animal part alone: and in a few cases, as I have already observed, to retard the appearance of even the first set till ten or twelve years of age. [Plenck extracted from a girl, seven years of age, a canine milk-tooth of the lower jaw, which was livid, as soft as cartilage, and compressible by the fingers, especially at the fang§.] But the opposite extreme is by far the most frequent; and where this exists in a considerable degree, we not only find occasionally all

* Lib. xiv. Obs. 9.

† Hortus Genialis, p. 337.

‡ Bloch, Medicinische Bemerkungen, p. 19. For others, see Nosolog. in loc.

§ De Morb. Dentium, p. 39.

the irregularities already noticed as resulting from plurality, but sometimes inseparable union* between the teeth and their sockets, so that it is impossible to extract them without fracturing the socket; sometimes a perfect continuity or coalition between all the teeth†, insomuch that, in one instance, the whole was found to constitute a single bone or curb of ivory.‡ Then again, we sometimes meet with a production of teeth in other parts of the mouth than the gums, and particularly in the palate, of which examples are to be found in Schenck§ and Borelli|| Albinus records an instance, in which a canine tooth grew in the substance of the nasal process of the jaw-bone below the orbit.¶

Another cause of irregularity in the ascent of the permanent teeth is an inaccordance of time, or manner, in the absorption of the fangs of the first set of teeth, and the protrusion of those of the second set. As the latter fangs are thrown forth, the former, in all cases of regularity, are carried away: and hence the permanent teeth, pressed forward by the gradual prolongation of their fangs, bear before them the mere crowns of the shedding-teeth, and find little resistance to their ascent. In former editions, the author referred to these circumstances in proof of the vascularity of the teeth; observing that, as the fangs pullulate from the bodies of the teeth, the latter parts must have vessels. The truth is, however, that the fangs are formed from the vessels of the prolongations of the pulp.] Now, if the fangs of the upper set be not sufficiently carried off, or, in other words, the crown of the teeth be not sufficiently detached and set at liberty, as the under set or any particular teeth in the under set, press forward, the latter must necessarily be thrown out of their proper line, and rise within, or without, or wherever they can force their way.

GEN. I.
SPEC. IV.
O. De-
formis.
Deformity
of the teeth.

Inaccord-
ant action
of the first
and second
set.

* Courtois, *Dentiste Observateur*.

† Bartholin. *Hist. Anat. Sent. i. hist. 35.* Henckel, *Sammlung Med. und Chir. Anmerkungen*, vii. N. 16.

‡ Schenck, lib. i. Obs. 412. Andral, *Anat. Pathol.*, t. ii. p. 262.

§ Schenck, lib. i. Obs. 411.

|| Cent. ii. Obs. 81. The supernumerary teeth, which are formed independently of the regular ones, may be in the same line with them, though this is rare. Thus, Soemmerring saw five incisors in the upper jaw. Meckel mentions one instance, in which a rickety girl, fifteen years of age, had small bony points, resembling denticulations of fish, interposed between the regular teeth; and Tesmer met with an individual, whose upper jaw contained four supernumerary molar teeth, arranged in the same line with the others; three on the right side, and one on the left. In general, supernumerary teeth are not in the same line with the rest: they may be directly behind the incisors, or scattered over the roof of the mouth. Sandifort recites a case, in which there were thirty-six teeth in each jaw. Supernumerary teeth are more frequently noticed in the upper jaw than the lower; and the cutting and canine teeth are more commonly redundant than the molar. See Andral, *Anat. Pathol.*, t. ii. p. 263. — Ed.

¶ Annot. Acad., tom. i. p. 54. The reference of these various cases simply to redundancy of calcareous matter, is not altogether satisfactory, inasmuch as no redundant tooth can be formed without some peculiarity in the pulp. An extraordinary number of teeth may occur under three circumstances: the milk teeth may not drop out in proportion as the permanent ones rise; 2dly, true supernumerary teeth may be formed; 3dly, a second developement of the same tooth may take place. The first case requires no comment; in the second, there may be either an aggregation of several germs, and the supernumerary teeth united to the regular one; or these may be completely separated from it; or a prolongation may be sent off from the regular tooth, giving it the appearance of being double. See Andral, *Anat. Pathol.*, t. ii. p. 263. — Ed.

GEN. I.
SPEC. IV.
O. De-
formis.

Second set
wider than
the first.

The second set of teeth is also wider than the first ; and hence, with the exception of the bicuspidati, which from this very circumstance rise under the shedding molares, every single tooth in its ascent must be opposed to more than a single tooth above it ; whence another source of difficulty, and often of irregularity. In consequence of all which, it is rather to be wondered at, that we do not meet with more frequent instances of deranged or misshapen teeth than actually occur to us. And nothing can be clearer, than the necessity of a close and skilful watch over them during the shedding season, so as to remove any of the first set when they form an undue degree of resistance to the permanent, and have a tendency to throw them out of their proper line ; and any of the second set that may exceed their proper number, and, by their surplus, crowd and misplace the rest.

SPECIES V.

ODONTIA EDENTULA.

TOOTHLESSNESS.

LOSS OR WANT OF TEETH.

GEN. I.
SPEC. V

THIS is also a very common affection, and offers the following varieties :—

| | |
|--------------------------|-----------------------------|
| α Peculiaris. | From constitutional defect. |
| β A vi extrinseca. | From external violence. |
| γ A carie. | From decay. |
| δ Senilium. | From old age. |

α O. Edentula Peculiaris.
From constitutional defect.

As the teeth are often produced supernumerously, so are they often naturally deficient in number. [Sometimes the germs of the permanent teeth are either wanting, or are not developed, and then the milk-teeth are in certain instances not shed during life, but merely diminish in size from the effect of a larger attrition than what they were designed to bear. In other cases, the milk-teeth are shed as usual, but not replaced. Lastly, examples occur, in which no teeth whatever are produced, and individuals have been known to reach a very advanced age, without ever having had a tooth in their mouths. If the edge of the jaws of persons thus circumstanced be examined, it will be found to be of a fibro-cartilaginous consistence, like the hard substance noticed in infants which have not yet cut their teeth ; or like what is reproduced in old persons, or that which always exists in ruminant animals in the places where their jaws are naturally destitute of teeth.* But, the absence of teeth in man may be only partial ; and, in this case, there is a difference in the frequency of the defect in relation to the kinds of teeth.] The dentes sapientiæ,

* Andral, Anat. Pathol., t. ii. p. 261.

which are the last cut, are those which are most frequently not produced at all; however, there is hardly any particular tooth that has not sometimes failed in its development. This is sometimes the case with the bicuspidati, as it is not uncommon to meet with a person in whom one, two, or more of these have never made their appearance. But it occurs more frequently in the incisors particularly of the lower jaw: and Mr. Fox refers to an instance, in which this defect appertained to several individuals of the same family, none of whom had ever cut these incisors. [In one example on record, there were only four permanent teeth in each jaw, and in another, only a single incisor in the upper jaw.*]

But the other varieties of cause are more obvious and common: being

Violence, by which they are suddenly misplaced, or knocked out;

Caries, or inflammation of the surrounding sheaths, by which they become loosened in their sockets; and

The natural absorption of their sockets in advanced life.

In many instances, therefore, the separated teeth are in a sound state; and, in a few instances, where the alveolus is also perfect, and the tooth has only been out of it for an hour or two, so that its living principle has not altogether ceased, it may be replaced and will take a fresh hold and become serviceable for many years; though it rarely, perhaps never, forms so firm and permanent an attachment as before the accident which threw it out.

Mr. Hunter extended this mode of supply to a transplantation of teeth from other persons: and, at one time, this method also was carried to a considerable extent of practice. Too much caution, however, cannot be employed in ascertaining the health of the individual by whom the scion-tooth is to be furnished; for syphilis, and other diseases, may be transplanted at the same time. As an instructive case upon this subject, I may refer to the following, drawn up by Dr. Watson, and inserted in the Medical Transactions.† An incisor tooth of the upper jaw, from an unknown cause, becoming carious in a young unmarried lady about twenty-one years of age, it was extracted, and the place very dexterously supplied by a like tooth from another young woman, who, upon examination for the purpose, appeared to be in good health. The scion-tooth very rapidly took a firm hold, and soon bid fair to be of great service and ornament. In about a month, however, the mouth became painful, the gums inflamed, discoloured, and ulcerated. The ulceration spread very fast, the gums of the upper jaw were corroded, and the alveoli left bare. Before the end of another month, the ulceration stretched outwardly under the upper lip and nose, and inwardly to the cheeks and throat, which were corroded by large, deep, and fetid sores. The alveoli soon became carious, several of the teeth gradually dropped out, and at length the transplanted tooth, which had hitherto remained firm in its place.

About this time blotches appeared in the face, neck, and various parts of the body, several of which became painful and extensive ulcers; a considerable degree of fever, apparently hectic, was excited; a copious and fetid discharge flowed from the mouth and throat;

GEN. I.
SPEC. V.
α O. Edentula Peculiaris.
From constitutional defect.

β O. Edentula à vi extrinseca.
From external violence.

γ O. Edentula à carie.
From decay.

δ O. Edentula Senilium.
From old age.

Hence separated teeth often sound.

Transplantation of teeth.

Danger of, elucidated.

* Fox on the Teeth. Sabatier, Anat., tom. i. p. 78.

† Vol. iii. art. xx.

GEN. I.
SPEC. V.
O. Edentula.
Toothlessness.

which impeded sleep, and the soreness of the fauces prevented a sufficiency of nourishment from being swallowed.

The wisest plan would probably have been to have commenced from the first with a mercurial process, before the system had been so far debilitated, and the general health so deeply encroached upon, as to render any plan of very little use. An antiseptic course, however, of bark and other tonics was first tried and persevered in till found to be of no service whatever; and calomel pills in an alterative proportion were then had recourse to in their stead. This plan was found to soften every symptom, and totally to eradicate many: but the bowels were soon affected with severe pain and purging; and the calomel was exchanged for strong mercurial ointment; which, from the present debility of the patient, soon produced a like effect, and an effect that could not be corrected by opium; and, in the end, the patient fell a victim to the experiment. The person from whom the tooth had been taken, had in the mean time continued in perfect health; and upon a minute inspection, as well of the sexual organs as of the mouth, evinced not the slightest syphilitic affection.

The case is mysterious, and leaves much ground for the imagination to work upon. If it be difficult to conceive it to have been syphilitic, it is more difficult to conceive it to have been any thing else. But the grand lesson to be learnt from it, on the present occasion, is that of the wariest caution, and a caution amounting almost to a prohibition, in remedying a deficiency of teeth by transplantation.

Such evils
how accounted for
by Mr. J.
Hunter.

Other cases might be advanced, but it is unnecessary. Mr. Hunter, partial to his own invention, endeavoured to account for most of these upon the principle of local irritation exciting remote evils, or universal sympathy. Yet the cases of mischief have been so severe and numerous, that the practice has long fallen into great disrepute.

Mere
crowns of
sound teeth
may be
safely
transferred.

A transfer, however, of the mere crowns or bodies of sound teeth, with the fangs filed off, does not seem to have been productive of the same evil effects; and hence these may be conveniently made use of when the body of one or more teeth has been destroyed by caries, while the fangs have remained sound: for, by screwing a piece of gold wire into the crown of the scion-tooth, and boring a hole into the fang of the lost tooth, the former may be made to take a firm hold without any attachment to the adjoining teeth; and, if due care be taken in the selection, it will make the best match, and produce the most perfect supply, that human art can bestow.

When natural teeth are not employed, the dentist has recourse to artificial teeth, commonly obtained from the tusk of the hippopotamus; though, in order to confer a greater durability, they have of late years been ingeniously formed of a composition of porcelain earth properly modelled and burnt.

SPECIES VI.

ODONTIA INCRUSTANS.

TARTAR OF THE TEETH.

THE TEETH INCRUSTED WITH EXTRANEOUS MATTER.

THE teeth are always subject to be covered over with layers of an earthy material, secreted as a constituent part of the saliva, and denominated tartar. GEN. I.
SPEC. VI.

Simple as this substance seems to be, no very clear explanation either of its origin or character has hitherto been given. According to Professor Berzelius, tartar, when it first settles on the teeth, is mere hardened mucus: "but during the destruction of the mucus," says he, "we insensibly trace phosphate of lime on the enamel of the tooth, which is sometimes increased to a crust of the thickness of from a fourth to the half of a line: and in this state it contains, besides the phosphate, about a fifth part of its weight of mucus which has been exsiccated in the earthy mass."* Chemical principles of the tartar.

Tartar of the teeth, therefore, as far as it has been analyzed, consists of concrete or dried saliva, hardened by its own earthy materials. As it flows from the salivary ducts, it is always found most accumulated around those teeth which are situated nearest to their openings. In some persons the saliva is more loaded with earthy materials than in others; for, while some have very little trouble in keeping their teeth free from this deposit, in others it forms so copiously, that nothing, but an unremitting attention, will preserve their teeth from being covered with it. Varies in the quantity secreted.

While this material continues soft, it has a yellowish appearance; but as it hardens, it changes to a dark brown or a black; and often, in children, to a dark green. By degrees the teeth lose all their beauty to the eye, the gums are detached from their respective necks, are irritated and inflamed; the alveolar processes of the teeth are exposed, absorption takes place, and the teeth become loosened; while the breath is loaded with a disagreeable fetor, from the decomposition of such a mass of animal matter. In some cases, the accumulation has been so enormous, as to be half an inch in thickness both on the outside and inside of the teeth†, or to cover the whole range of teeth, and unite them into a solid heap.‡ Progress of the disease.

It is almost superfluous to point out the necessity of attention to prevent so foul a disfigurement. The daily use of a tooth-brush with any of the ordinary tooth-powders will in most cases be sufficient for this purpose. The basis of these powders is of little importance, provided they contain nothing, that may injure the enamel. Pulverized fish-shells, cuttle-fish-bone, boles, bark, myrrh, mastic, soot, and charcoal, may be used with equal advantage, according to the fancy; and when an odour is wished for, it may How prevented by habitual attention.

* Animal Chemistry, p. 32.

† Berdmore, p. 56.

‡ Eustachius, Tract. de Dentibus, cap. xxix. Stoeler, Beobachtungen, &c. N. 3.

GEN. I.
SPEC. VI.
Odontia
Incrustans.
Tartar of
the teeth.
Milder
acids may
be em-
ployed.

be obtained from ambergris or orris-root. It is only necessary to observe, that the powder be innocent in its quality and impalpable in its reduction.

If the tartar yield not to these means, the milder acids may be applied. I have already observed, that there are but four known acids for which the lime of the teeth has a stronger attraction than for the phosphoric with which it is combined; and these four are, the oxalic, sulphuric, tartaric, and succinic. From these, therefore, we ought sedulously to abstain; but most of the rest may be used very harmlessly, and will often be found, by the friction of a tooth-brush, to dissolve the tartar of the teeth without making the least impression upon their substance.*

Scaling.

But if the deposit still bid defiance to our exertions, it must be removed by the operation of scaling; and the gums afterwards be washed with some pleasant astringent lotion.

Accumula-
tion, how
prevented
in India.

In India the accumulation of tartar is prevented by an application named *miscee*, which produces indeed a black jet upon the teeth, but leaves the enamel untouched, while it destroys the tartar and hardens the gums. Its ingredients are not known.

SPECIES VII.

ODONTIA EXCRESCENS.

EXCRESCENT GUMS.

THE SUBSTANCE OF THE SURROUNDING GUMS EXCRESCENT.

GEN. I.
SPEC. VII.

NOT only by the concrete deposit called tartar, are the teeth occasionally incrustated and buried, but sometimes by a prurient growth of the substance of their own gums, which from different circumstances appears under the two following forms:

α Spongiosa.

Scurvy of the gums.

β Extuberans.

Extuberant gums.

Fungous or spongy gums.

With distinct extuberances on the surface.

α O. Excre-
scens spon-
giosa.
Scurvy of
the gums.

The gums sometimes assume a soft fungous or spongy appearance: and this too, as Mr. Hunter has observed, in persons who

* In recommending the use of the milder acids, the author has not duly considered their effect upon the carbonate and fluat of lime, which enter into the composition of the bone, and still more freely into that of the enamel, of the teeth. Were the teeth composed entirely of phosphate of lime, then certainly the weak acids could do no harm; but as the fact is otherwise, their use is far from being commendable. Two of the acids most frequently employed in medicine, are seriously destructive of the teeth, though not enumerated in the author's list of those which are calculated to decompose the teeth. When a tooth is steeped in diluted muriatic acid, its earthy matter is dissolved, and the animal substance, with which it was united, left in a flexible state, and of the shape of the perfect tooth. What chemist is unaware that diluted nitric acid will dissolve the enamel? — ED.

are in all other respects perfectly well*: and this case, though vulgarly called a scurvy of the gums, is distinctly an idiopathic affection. It may however be symptomatic of dyspepsy or some other disorder of the stomach, or some equally remote organ; or the result of a morbid state of the alveoli, or teeth themselves; and, unquestionably, it may appear as a symptom of porphyra, or real scurvy, affecting the system generally.

GEN. I.
SPEC. VII.

If the craggy stump of a tooth be the source of irritation, it will be in vain to attempt a cure till the relic of the tooth be removed: and, if the socket be in fault, it will be necessary to expose and examine it. But, in all cases, in which the disease originates in the gums, and depends upon a lax state of their texture, scarification, freely and repeatedly made use of, will be the best, and, in many instances, the only remedy. It discharges the overloaded vessels, and leads both to immediate ease and a radical cure. I have frequently found it necessary to follow up the scarification into the roof of the mouth, which often partakes of the irritation, and is puckered into wrinkles of exquisite tenderness, that cannot endure the slightest touch. After scarification, the gums and mouth should be washed with some warm and resinous tincture, as that of bark and myrrh; and be gradually accustomed to the friction of a tooth-brush, and some astringent tooth-powder, in the choice of which the patient may be allowed to please his own fancy; though perhaps the best are those prepared from several of the more astringent funguses, and especially the *cynomorion coccineum* of Linnéus, better known by the name of *fungus Mellitensis*. And, if this plan be not sufficiently stimulant, it will be necessary to wash the mouth and gums with a very dilute solution of nitrate of silver; or to apply it, with a pencil-brush, to the gums alone in a much stronger state. Dr. Paris recommends as a dentifrice equal parts of powdered catechu and bark, with one-fourth the quantity of powdered myrrh.†

Scarifica-
tion the
best re-
medy.

Astringent
applica-
tions.

The exuberant excrescence, which forms our second variety, is sometimes firm and unyielding, rising into distinct and hardened knobs, instead of assuming the appearance of soft and spongy germinations. In these cases, the general texture and consistence is that of the gums themselves: and the only radical cure consists in extirpating them with the knife, a ligature, or caustic. Even after extirpation, they are very liable to grow again, and with great obstinacy and perseverance. Mr. Hunter mentions a case, in which they were reproduced six times, as he suspected, from a cancerous disposition. They are also, in general, largely supplied with blood-vessels, which often produce a troublesome hemorrhage after the operation; [for, as Mr. Hunter observes, arteries, going to increased parts, are themselves increased, and, becoming diseased, have not the contractile power of a sound artery.‡

β O. Ex-
crescens ex-
tuberans.
Firm extu-
berances of
the gums.

Excrescences from the gums sometimes have so cancerous an appearance, that surgeons are fearful of meddling with them. Here a remark made by Mr. Hunter, is extremely valuable to the practitioner; namely, that when the swellings arise at once from the gum, which appears to be the only diseased part, they have no

* Diseases of the Teeth, ch. iii.

† Pharmacol. vol. ii. p. 131. 5th edit. 1823.

‡ See Natural Hist. of the Teeth, p. 170. 3d edit.

GEN. I.
SPEC. VII.

malignant disposition. When, however, there is strong evidence of a tumour having originated deeply in the alveoli, the teeth, perfect as they may be in appearance, must be sacrificed, as well as the alveolar process itself. The worst diseases of the gums, as Mr. C. Bell has remarked, do not proceed from the irritation of bad teeth. We frequently see, indeed, a carious tooth attended with ulcer and gumboil, abscess of the jaw, fungous tumour of the gums, and even necrosis of the bone. We find the pain of the inflammation equal to that of *tic douloureux*: but the case is not to be compared, in point of danger, with the tumour, which has a deeper source, and is frequently seen growing up beneath sound teeth. The hemorrhage that follows its removal may generally be stopped with a dossil of lint, dipped in muriated tincture of iron, and pressed into the bottom of the wound.*

There cannot be a doubt, that many cases on record, which are described as malignant diseases of the gums, and as having proved fatal, by extending themselves up to the base of the brain, were, in fact, fungous diseases of the antrum.†]

GENUS II.

PTYALISMUS.

PTYALISM.

INVOLUNTARY FLOW OF SALIVA FROM THE MOUTH.

GEN. II.
Analysis of
saliva.

THE saliva issues from three distinct sets of glands, distributed over different parts of the mouth, as the parotid, the submaxillary, and the sublingual; [and, according to Berzelius, a quantity of it equal to 1000, consists of water 992.9; a peculiar animal matter 2.9; mucus 1.4; alkaline muriates 1.7; lactate of soda and animal matter 0.9; pure soda 0.2.†] What Berzelius sets down as mucus, is considered by Professor Thomson and Dr. Bostock to be albumen. This is insoluble in water, and, when incinerated, affords a large portion of phosphate of lime. The tartar of the teeth is derived from its gradual decomposition upon them. The recent investigations of Tiedemann and Gmelin, however, to which reference has been made in the physiological proem, prove saliva to be a more compound fluid than was formerly supposed; and one of their principal discoveries is, that the sulpho-cyanic acid, a most active poison, combined with potass, enters into its composition. Its solid contents are found to be, according to some chemists, 7 in 1000 parts, but, according to others, $\frac{1}{25}$ per cent. The quan-

* See C. Bell's *Surgical Obs.* vol. i. p. 413, &c. and Gibson's *Institutes of Surgery*, vol. ii. p. 323.

† For examples of the fatal ravages of some diseases of the gums, consult J. Bell's *Principles of Surgery*, vol. iii.; C. Bell's *Quarterly Report*, vol. i.; Hill, in *Edinb. Med. and Surg. Journ.* No. 61; and Gibson, in *Philadelphia Journal*, vol. ii.

‡ See *Med. Chir. Trans.* vol. iii. p. 242.

tity of saliva secreted daily is considerable. Nuck and Lanzoni estimated it at a pound in twelve hours; Mr. Cruickshank at a pound in twenty-four hours; but it must vary according to circumstances. The secretion is more copious in children and old persons, than in adults; in cold, than in warm climates; in the day, than the night. The smell or sight of any agreeable food makes the saliva flow into the mouth with surprising rapidity. The same effect results from the irritation of smoking tobacco; and from that of bitter, sour, or salt substances in the mouth. The habit of frequently ejecting spittle from the mouth renders an augmented secretion of it necessary. A person's talking much has a similar consequence; and so large is the quantity of saliva secreted during meals, that Sabatier saw a soldier, who, at these periods, used to wet several towels with what was discharged from a fistula communicating with the parotid duct.* In disease, the secretion of saliva is sometimes increased; sometimes, almost suppressed.] Its office is twofold: that of moistening the mouth in combination with a small portion of mucus secreted by the labial and buccal glands, and that of contributing to the digestion of the food in the stomach and duodenum.

GEN. II.
Ptyalismus.
Ptyalism.

Under the influence of the irritating passions, and especially of violent rage, it assumes a frothy appearance, and in many animals becomes poisonous. It is said, indeed, to become so sometimes in man himself.†

How
excited.

When the saliva is secreted in a healthy proportion, and the various muscles of the mouth perform their proper office, it is never discharged from the mouth, unless voluntarily; but passes readily from the fauces into the œsophagus. But it may be secreted immoderately, or the muscles of deglutition may not properly perform their functions: and, in either case, the saliva will flow from the mouth involuntarily, accompanied with a specific difference of symptoms. And hence ptyalism, as a genus, offers the two following species of disease.

Immoderately
secreted in
various
ways.

- | | |
|-----------------------|-------------|
| 1. PTYALISMUS ACUTUS. | SALIVATION. |
| 2. ————— INERS. | DRIVELLING. |

SPECIES I.

PTYALISMUS ACUTUS.

SALIVATION.

INCREASED SECRETION OF SALIVA FROM AN INCREASED ACTION OF THE SALIVARY GLANDS.

AN increased action of the salivary glands, productive of salivation, occurs not unfrequently as a symptom of some other disorder;

GEN. II.
SPEC. I.
Ptyalismus
acutus.
Sometimes
symptom-
atic.

* *Traité d'Anat.* tom. ii. p. 171. Dr. C. G. Mitscherlich, of Berlin, lately met with a similar case, in which the more solid and grateful the nature of the food was, the more copiously was the secretion of saliva carried on; but when the masseters and tongue were at rest, and no stimulus was present, it ceased altogether. During meals, he found the saliva alkaline; at other periods, acid. — Ed.

† Hoffman, *Diss. de Salivâ ejusque Morbis*, p. 24.

GEN. II.
SPEC. I.
Ptyalismus
acutus.
Salivation.

and a symptom that in many cases proves highly salutary and even critical: as in fevers of various kinds, exanthems, of which Dr. Perceval of Dublin writes me word, he has had instances in miliaria with transparent vesicles, in jaundice, and dropsy; and other examples of which are given in the author's Nosology. It often takes place also in suppressed discharges of various kinds, as those of menstruation, perspiration, and urine, and is occasionally found a useful substitute. But as in all these cases it is a mere concomitant or dependent affection, we must defer our consideration of it in these relations, till we come to the diseases themselves of which it is a symptom or sequel.

Produced
by siala-
gogues;

by mecha-
nical press-
ure;

by remote
mechanical
irritation.

Cause
sometimes
obscure.

The salivary glands are directly excited to an increased action by stimulants, or sialagogues, as they are called, of various kinds. There are numerous plants endowed with this power, which in their roots, bark, or leaves, contain a warm, acrid juice: as tobacco, mezereon, pyrethrum, or pellitory of Spain; *pimpinella saxifraga*, or smaller burnet saxifrage; imperatoria, or masterwort. Simple mechanical pressure, produced by the manducation of any hard substance, as when we eat a dry biscuit, is also a stimulant of the same kind; far less active indeed, but highly useful in its effect as tending to resolve the substance to which the pressure is applied. Dentition is a common cause at whatever time the teeth be produced. Even the mechanical irritation of another organ, with which the salivary glands are closely connected by continuity or sympathy, will often lead to a like effect. Mr. Powell has given an interesting instance of this in vol. ii. of the Medical Trans. of the College. A piece of wool accustomed to be worn in the ear, had imperceptibly slid into the meatus auditorius, and for upwards of two years stimulated the organ without being suspected; during the whole of which period the patient discharged from a pint to a pint and a half of saliva daily. The ear itself at this time became painful, and was examined; the piece of wool was detected, and extracted in a very offensive state; and the salivation in a short time entirely subsided. In like manner, it is a frequent accompaniment of pregnancy; as it is occasionally of some other irritation of the stomach or intestinal canal; in which last case it frequently betrays its source by a saccharine taste. [In some cases, the cause is obscure. The editor knows a gentleman, who had several annual and tedious attacks of a very debilitating ptyalism, the reason of which was by no means apparent from any particularity in the previous state of his health, or in his regimen; and M. Ribes mentions a porter at the hospital for invalid soldiers at Paris, who was annoyed for six weeks with a salivation, that used to increase in such a degree at night, that the flow of saliva from the mouth might have been compared to a shower of very clear water.* No cause could be assigned for the complaint.]

* See Dict. des Sciences Méd. tom. xlix. p. 459. M. Andral could detect no morbid appearances in the salivary glands of a man, who had had a ptyalism of long duration from no evident cause. Anat. Pathol. t. i. p. 345. M. Rayer relates the case of a woman, aged 24, who for many years, without any obvious cause, had an attack of profuse salivation every month or six weeks. The complaint generally continued 36 or 48 hours, the quantity of fluid excreted amounting to several pints in the course of 24 hours. Opium and quinine had no effect in relieving

Generally speaking, however, though not always, an increased flow of saliva from any of the above causes is of such short duration and so easily removed when troublesome, that it is rarely the subject of medical attention; and the only varieties to which it gives rise, that are particularly worthy of notice, are the following:

- | | |
|-----------------------|---|
| α Hydrargyratus | Produced by the use of mercury or its |
| Mercurial salivation. | preparations. |
| β Sensitivus. | Produced by the sight, smell or thought |
| Mouth-watering. | of agreeable food. |
| γ Mellitus. | Accompanied with a sweet or mucilagi- |
| Sweet-spittle | nous taste. |

Quicksilver, in whatever mode introduced into the system, whether by the skin, the stomach or the lungs, uniformly stimulates the salivary glands, and produces an increased flow of saliva: and is almost, if not altogether, the only substance we know of, which, introduced internally, universally acts in this manner. Nitric and other acids have been suspected to produce a like operation.

[The author of this work and Dr. Paris, however, both consider the opinion groundless.* Yet, according to the evidence of Dr. Scott, if the nitro-muriatic acid, lotion, or bath, be employed to a certain extent, tenderness in the palate and mouth, and pytalism, are sometimes produced; but without any offensive smell of the breath or loosening of the teeth, as from mercury. These effects were excited in himself and others, and he had seen as violent a salivation thus raised, as he had ever noticed from mercury.†]

Antimony has also been thought by a few practitioners to have some such influence upon the salivary glands. "Dr. James lately informed me," says Sir George Baker‡, "that for sixteen years past his fever powder has contained no mercury; and yet, that within that space of time he has known at least six instances of a salivation raised by his medicine. He added, that the patients who were thus salivated had neither their teeth loosened, nor their breath made offensive, as happens in a mercurial pytalism." Fusch tells us, that he has occasionally observed a like effect§; as does Willich, when tartarized antimony has been employed.|| [According to Dr. Paris, the latter medicine in nauseating doses certainly promotes a salivation by mercury; and so does the accidental supervention of any disease of debility.¶] The editor has seen in the King's Bench and Fleet prisons four or five cases in which an annoying degree of salivation proceeded from the free use of the compound squill pill. A similar fact is recorded by Quarim.**]

From the general tendency of mercury to produce this specific effect, those who are engaged in working quicksilver mines, as

GEN. II.
SPEC. I.
Pytalismus
acutus.
Salivation.

α P. hy-
drargy-
ratus.
Mercurial
salivation.

Salivation
produced
by mer-
cury, how-
ever intro-
duced into
the system.

The only
medicine
that thus
acts.

Effects of
mercury on
miners.

the disorder, but it was finally cured by the subcarbonate of iron. (Journ. de Chimie Méd. Avril, 1833.)

* Pharmacologia, vol. i. p. 202., 6th edit.

† See Med. Chir. Trans. vol. viii. p. 183., and Beddoe's Contributions, p. 430.

‡ Medical Transactions of the College, vol. i. p. 378.

§ Dissert. de Antochiria. Jen. 1681.

|| Baldinger, N. Magazin. band viii. p. 252.

¶ Pharmacologia, vol. i. p. 288., 6th edit.

** Animadversiones Pract. Viennæ, 1786.

GEN. II.
SPEC. II.
α P. hy-
drargy-
ra-
tus.
Mercurial
salivation.
Effects on
manufac-
turers.

Singular
effect on
board the
Triumph.

Different
effects on
different
constitu-
tions.

those of Idria or New Spain, are almost continually in a state of salivation: and when, which is often the case, condemned as criminals to such labour for life, drag on a miserable existence, in extreme debility and emaciation, with stiff incurvated limbs, total loss of teeth, and equal loss of appetite, till death in a few years, with a friendly stroke, puts a period to their sufferings.*

From the facility with which quicksilver evaporates, and combines, not only with other metals, but with almost all other substances, and especially with many of the elastic gases, a considerable degree of injury is often sustained by workmen in manufactories, in which quicksilver is occasionally employed, without their being for a long time aware of the cause. An instance of a similar kind occurred on board the *Triumph* man-of-war, which had received on board thirty tons of quicksilver contained in leathern bags of fifty pounds each, that had been picked up on the shore at Cadiz from the wreck of two Spanish line-of-battle ships, that had been lost during a storm in March 1810. The bags were stowed in the hold, and other low parts of the ship; but being saturated with sea water, they soon decayed and burst. The quicksilver, thus let loose, was collected as well as it could be, and committed to proper casks: but, much of it escaped into the recesses of the ship; and not a little was secreted by the sailors, who amused themselves with it in various ways. The quicksilver that had escaped unnoticed sunk into the bilge-water, became partially decomposed, and ascending soon after, amidst an intolerable stench, with the vapour of the water, coated every metallic substance in the ship with a black hue; and at the same time a general affection of the mouth took place among the men and officers, to such an extent, that no less than two hundred became severely salivated, and did not recover till the ship, being carried into Gibraltar, was docked and cleaned to its lowest planks.

Mercury, however, produces different degrees of effect upon different constitutions or states of the body. In a few rare instances, it has exerted no sensible influence whatever upon the excretories of the fauces: in others, a very small quantity of almost any of its preparations has stimulated them at once to a copious discharge.

In persons of a highly nervous or irritable temperament, I have known salivation produced by a single dose of calomel; and that it is sometimes caused by dressing ulcers with red precipitate, is a fact mentioned by Hildanus, and well known to all experienced surgeons. In scorbutic, scrofulous, and other debilitated habits very small quantities of mercury will sometimes act in the same manner; and hence a considerable degree of caution is requisite in all cases of this kind. Even the wearing of a leathern girdle, or the occasional application of white precipitate or mercurial ointment to the head to destroy vermin, has often excited salivation.

* "Emaciation is the constant attendant of a mercurial course. In producing their effects, mercurial preparations, whether oxides, chlorides, cyanides, iodides, or any other, are decomposed, and the mercury, in a metallic form, is either thrown out of the body by the skin and lungs, or deposited in the glands and bones." In *Rufeland's Journ.* it is stated, that a pelvis, infiltrated with mercury, and taken from a young woman who died of syphilis, is preserved in the *Lubben Museum of Midwifery*. See *Thomson's Elem. of Materia Med.* t. i. p. 370—372.

When mercurial salivation is produced, it is accompanied with a high degree of irritation, not only of the mouth and fauces, but of the system generally. The common course of symptoms is as follows: the mouth feels unusually hot, and is sensible of a coppery or metallic taste; the lingual and sublingual glands swell; aphthous vesicles appear, and terminate in minute and offensive exulcerations; the tongue tumefies; the throat becomes sore; pyrexia and sleeplessness supervene, and are, indeed, often present from an early period of the disease; while in idiosyncrasies, or habits of great irritability, we frequently find the surface of the body wholly, or in particular parts, reddened with a peculiar erythematic inflammation, continuous or in patches, to which the name of hydrargyria has been given by some writers, and that of *erythema mercuriale* by others. [Gangrene and necrosis may be the consequences of immoderate mercurial salivation. Large sloughs of the parts in the mouth are very common. Cullerier has seen a partial necrosis of the lower jaw produced in this manner, and, in one young woman, a complete necrosis of the upper and lower alveolar arches.* The editor of this work has witnessed several melancholy examples of the same kind.]

It is difficult to determine by what means mercury produces its effect on the salivary glands. Dr. Cullen attempted one explanation of the subject; namely, that "mercury has a particular disposition to unite with ammoniacal salts, and that such salts are disposed to pass off by the salivary glands more copiously, than by any other excretion." But, as Dr. Murray has remarked, mercury has not any peculiar tendency of this kind. Indeed, if it had, no ammoniacal salts are mentioned, either by Berzelius, or by Tiedemann and Gmelin, as entering into the composition of the saliva. Dr. Cullen regards mercury as nothing more than a general irritant, operating equally upon all the sensible and moving fibres of the body, and hence powerfully operating upon all the excretories of the system, without having a special affinity to one set more than to another. "It proves often," says he, "diuretic; and I have particular proofs of its reaching and acting upon the organs of perspiration."† Another hypothesis is that of Sir Gilbert Blane‡, who considers the salivary glands as one of the outlets for the ramenta of the bones, because lime is detected in the saliva, and even concretes on the teeth. Now, as mercury is known to produce an active absorp-

GEN. II.
SPEC. I.
a P. hydrargyratus.
Local symptoms of salivation.
Hydrargyria.

Difficulty of accounting for it. Cullen's explanation.

* Dict. des Sciences Méd. tom. xlix. p. 455.

† Mat. Med. vol. ii. p. 443. Professor A. T. Thomson entertains a similar view:—"Mercury," says he, "in whatever form it is administered, and in whatever manner it is introduced into the living body, acts as an excitant; a febrile state of the body is induced, evidenced both by the condition of the pulse, and that of the nervous system; and also by an augmented secretion and excretion of the saliva. It is this febrile excitement, overcoming, or destroying the morbid action begun and maintained in the frame by the introduction of the syphilitic or venereal poison into it, which cures syphilis. The action on the salivary glands is only a symptom of this general excitement, induced by mercurials, and not in itself essential to their curative power: it may not be produced by the administration of mercurials, and yet syphilis may be cured by them. In this case the mercurials are nevertheless taken into the circulation, for they communicate a blue appearance to silver articles in the patients' pockets." Elem. of Materia Med. vol. i. p. 371.

‡ Trans. for the Improvement of Med. Knowledge, vol. iii. p. 112.

GEN. II.
SPEC. I.
α P. hy-
drargyri-
tus.

tion of the solids, it is ingeniously conceived, that the fact in some measure explains its effect upon the salivary glands. However, as the kidneys and other excretory glands also furnish outlets for the old particles of the body, and yet are not affected by mercury in the same degree as the salivary glands, this theory cannot be retained.* The fact, however, remains the same, namely, that mercury, whether it possess a specific affinity or not for the excretories of the saliva, acts, from some cause or other, more readily and powerfully upon them than upon any other excretories whatever.

Medical
treatment.

In attempting a cure of salivation from mercury, our attention is to be directed to the local state of the fauces and the general state of the system.

Gargles and
purgatives.

If the throat be not much inflamed, acidulous gargles and acerb fruits, as the sloe, may be employed with great advantage, and should be used freely; but if there be considerable irritation, we must at first content ourselves with emollient gargles of barley-water or quince-seeds†: and in either case employ, at the same time, purgatives of Epsom or other neutral salts. When the system

Opium and
sulphur.

is much affected, sulphur and opium have been strongly recommended, and seem in many cases to have been successful. The former is trusted to, chiefly from its being well known to diminish the activity of mercury out of the body;—a doubtful reason, however, for our employing it internally.‡ The latter is certainly of considerable use in allaying the general restlessness and irritation of the system. The free exposure of the patient to a cool pure air was found by the late Mr. John Pearson to be one of the most decided means of checking profuse salivation. The diet should be of milk.

Cool dry
air.

It may also be added, that perhaps there is no disease, in which the Lisbon diet-drink, or compound decoction of sarsaparilla, may be used with better effect. Taken in the quantity of a quart a day, it carries off the effects of the poison, and supports the system.

Sarsapa-
rilla.

Emetics.

[Some cases of inordinate salivation, recorded by Dr. Haskins, tend to prove, that emetics have considerable power in relieving the disorder.§]

Mercury
valuable as
a medicine.

Like most other poisons, mercury, when properly directed, may be rendered a most valuable medicine; and is at this moment, in its multifarious forms, one of the most common, as well as one of the most efficacious, in the *Materia Medica*. In this place, however, we can only contemplate it as a source of disease.

β P. sensi-
tivus.
Mouth-
watering.

A certain degree of active ptyalism is also well known to be produced by any high degree of mental or sensorial excitement; in which case, the discharge most commonly assumes a frothy ap-

* See Paris's *Pharmacologia*, vol. i. p. 202., 6th edit.

† As a gargle, Dr. Thomson recommends alcohol or brandy and water, or the chloro-sodaic solution of Labarraque in water, in the proportion of one part of the solution to four of water. Vol. cit. p. 375.

‡ It is remarked by Professor A. T. Thomson, that the experience of those who have had the best opportunities of judging, has not satisfied them, that it possesses any efficacy in diminishing mercurial action. He adds, that if preparations of sulphur have at any time proved beneficial in checking salivation, the effect is to be referred to their acting either as sudorifics, or purgatives. *Elem. of Materia Med.* vol. i. p. 375.

§ Philadelphia Journal, No. 2.

pearance. This is particularly the case with violent rage, which stimulates the salivary glands almost as much as grief does the lachrymal. And as the same muscles of the mouth and throat are strongly roused in epilepsy and lyssa, we have here also a like increase of saliva, worked into the same sort of foam, and accompanied with a similar biting of the lips and gnashing of the teeth. But the most striking proof of this effect is produced by an eager longing for agreeable food of any kind, whether seen, smelt, or only thought of; and which is vulgarly denominated MOUTH-WATERING.

In man, this increase of secretion is seldom so considerable as to occasion an involuntary flow from the mouth; but, in dogs, it flows freely and continuously; for here the salivary glands are peculiarly irritable, so that the animal is almost constantly salivating; the discharge appearing to answer the purpose of insensible perspiration in other quadrupeds.

We meet also occasionally with an increased secretion of saliva from a cause less obvious, distinguished by a sweet or mawkish taste*; to which some writers have given the name of SWEET-SPITTLE.† It is the *dulcedo sputorum* of Professor Frank.‡ It may possibly exist, at times, as an idiopathic complaint, but is more usually connected with a morbid state of the stomach, and accompanied with a sense of nausea: the saccharine matter being formed, perhaps, by a like assimilating power as that possessed by the kidneys in diabetes. It is relieved by magnesia, and other absorbents; but is most effectually cured by an emetic, followed by warm stomachics. A lady of delicate habit, under my care, has been subject to this variety for some years. It returns irregularly, for the most part once in about a month or six weeks, and generally yields to a course of rhubarb, taken sometimes in conjunction with two or three grains of calomel. Bloch mentions a case, in which it returned at periods still more regular. § This variety of ptyalism is also occasionally the result of a scorbutic diathesis, but more frequently of phthisis; and especially in the last stage, when, as Frank observes, it is often “*insignis et ad nauseam usque molesta*.”

A ptyalism frequently occurs during dentition; and is by no means an uncommon sequel or crisis of other diseases.

In all these, as I have already hinted, it proves salutary, and terminates the disorder that excites it. Fevers afford, perhaps, the most numerous examples of this; and the following case is worth relating: A lady, aged twenty-four, of a delicate constitution, was attacked with a typhus, in the spring of 1788, which ran on for three weeks. She appeared to be in great danger; but on the twentieth day, a sudden and copious salivation took place that unaccountably afforded her great relief. It continued for upwards of a week, the daily flow from the mouth being never less than a pint and a quarter. In the mean while, she increased in strength, recovered her appetite, and got well.

We have numerous instances, in which this discharge has proved

GEN. II.
SPEC. I.
β P. sensitivus.

γ P. mellitus.

Sweet-spittle.

Ptyalism accompanies dentition; and fevers.

A crisis of small-pox and dropsy.

* Act. Nat. Cur. vol. iv. Obs. 59. 89.; vol. v. Obs. 71. Degaye, Diss. de Naturâ et Usû Salivæ. Monspel. 1783.

† Paullini, Cent. i. Obs. 81.

‡ De Cur. Hom. Morb. Epit. tom. v. p. 59. 85. Mannh. 8vo. 1792.

§ Bemerkungen, p. 203.

GEN. II.
SPEC. I.
γ P. mellitus.

Chronic
vomiting
hereby re-
lieved.

equally serviceable about the acme of small-pox *; though in one or two cases death has succeeded. † The fluid of dropsies is said to have been carried off at times by the same channel.

In the Medical Obs. and Inquiries, vol. iii. p. 241., there is a singular case of an obstinate vomiting of five months' standing being relieved, upon a return of salivation, which for this period had ceased. But perhaps one of the most extraordinary instances to be met with is related by Dr. Huxham, in the Phil. Trans. vol. xxxiii. for 1724. The patient was a man aged forty, of a spare, bilious habit, who had an attack of jaundice, followed by a paroxysm of cholic, this last being produced by drinking too freely of cyder. Among other medicines was given a bolus, containing a scruple of jalap, eight grains of calomel, and a grain of opium. Copious dejections followed; and a few hours afterwards the patient complained of pain and swelling in the fauces, spat up a little thick, brown saliva, which was soon considerably increased in quantity, of a deep colour, resembling greenish bile, though somewhat thinner. This flux of green and bilious saliva continued for about forty hours; during which time the quantity discharged amounted to four pints. The colour of the saliva then changed to yellow, like a solution of gamboge, with an increase rather than a diminution of the quantity. It continued of this colour for the space of forty hours more, after which it gradually became pellucid, and the salivation ceased as suddenly as it came on. During the flow of the saliva, the teeth and fauces were as green as if they had been stained with verdigris, and the teeth retained the same colour for a fortnight after the ptyalism had ceased. The patient had a few years before been suddenly attacked by a spontaneous salivation, so excessive as to endanger his life. In the present instance, therefore, it is probable, that the dose of calomel co-operated with the peculiarity of the constitution in exciting the discharge. But, whatever was its cause, it proved critical both of the jaundice and the cholic; for, from the moment it took place, the pain of the bowels ceased, and the greenish colour of the skin began to subside, the urine being at the same time secreted more abundantly, and of a blackish hue.

SPECIES II.

PTYALISMUS INERS.

DRIVELLING OR SLAVERING.

INVOLUNTARY FLOW OF SALIVA FROM A SLUGGISHNESS OF
DEGLUTITION WITHOUT INCREASED SECRETION.

GEN. II.
SPEC. II.

THERE is a second species, which belongs to this genus, in the present system, distinguished by the name of *inert ptyalism*, and which depends upon a want of command or power over the muscles of

* Act. Nat. Cur. vol. vii. Obs. 109. Fich, Diss. de Salivatione spontaneâ, præcipuè Variolarum. Jen. 1713.

† Riedlin, Lin. Med. 1695, p. 384. Weber, Obs. Med. Fascic. i.

deglutition, rather than on any increased action of the salivary excretories. In vulgar language it is denominated **DRIVELLING** or **SLAVERING**. It occurs under the three following modifications :

GEN. II.

SPEC. II.

Ptyalismus

iners.

- | | |
|----------------------|-----------------------|
| α Infantilis. | Of infancy. |
| β Senilis. | Of old age. |
| γ Moriaë. | Of dotards or idiots. |

It is found, therefore, in three states of life : among infants, before the will has acquired a power over the muscles of deglutition, and is altogether distinct from the salivary flux of dentition ; in advanced life, in which the will has lost its power ; and in idiots, who possess the power, but seldom or never exercise it. In the first case, time is the best physician ; in the two last, no physician can be of any avail.

GENUS III.

DYSPHAGIA.

DYSPHAGY.

PAIN OR OBSTRUCTION IN SWALLOWING, WITHOUT INFLAMMATION, AND MOSTLY WITHOUT IMPEDED RESPIRATION.

It is necessary to limit the character of this genus, as in the above definition, since inflammatory affections, in whatever part of the system they occur, constitute one natural order ; and dyspnetic affections, or those essentially impeding the respiration, another order ; and should, therefore, be arranged and considered in their respective associations: the former, under the diseases of the sanguineous function, and the latter, under those of the respiratory.

GEN. III.

Limitation

[Deglutition is a very complex operation, requiring the concurrence of many agents, from the mouth, where it begins, down to the cardiac orifice of the stomach, where it terminates. It may be divided into three stages : in the first, the food passes from the mouth to the pharynx ; in the second, it passes the opening of the glottis, and the nasal apertures in the fauces, and is carried into the œsophagus ; in the third it passes through this tube, and enters the stomach. When a portion of food has been sufficiently chewed, it is placed by the actions of mastication upon the dorsum of the tongue. Mastication is then suspended, and the tongue applied to the roof of the mouth in succession, from its point to its base. The alimentary bolus is thus pressed towards the pharynx, and soon meets with the velum palati, which is raised up by it into the horizontal position, and made a continuation of the palate. As the tongue continues to press the food, it would push it towards the nasal openings in the fauces, if it were not for the tension of the velum palati, produced by the circumflex muscles and the constriction of the pillars. With the exception of the motions of the velum, these actions in the first stage of deglutition are slow, voluntary, few, and successive. In the second stage, the actions

Organs

affected.

Mechanism

of degluti-

tion.

GEN. III.
Dysphagia.

are simultaneous, multiplied, involuntary, and rapid; the food is conveyed by them only from the middle to the bottom of the pharynx; but quickness is essential, in order that the aliment may not insinuate itself into the glottis, impede respiration, or glide into the nasal openings in the fauces, or the apertures of the Eustachian tubes. The aliment no sooner touches the pharynx, than it is embraced by this part and the velum palati. At the same instant, the base of the tongue, the os hyoides, and the larynx, are raised and carried forward to meet the morsel of food, and transmit it rapidly over the glottis, which is now shut, and also covered by the descent of the epiglottis. By the continued pressure of the pharynx and velum palati, the food is next pushed into the œsophagus, the larynx descends, the epiglottis rises, and the glottis itself is opened again for respiration. In the third stage of deglutition, the arrival of the food in the upper part of the œsophagus causes the superior circular fibres of this canal to contract, and propel the aliment towards the stomach. The subsequent fibres, now distended, contract in their turn; and the same changes are continued in succession, until the food gets into the stomach. The experiments of Magendie convince him, that the aliment passes very slowly down the œsophagus, and, when its ready entrance into the stomach is prevented, it will sometimes rise and descend again several times before it is ejected.* From the preceding account it must be manifest, that many different causes may be concerned in bringing on a difficulty of swallowing; and that dysphagy, strictly speaking, is not a disease itself, but only one of the most dangerous effects of the diseases to which the organs of deglutition, or other parts in the neighbourhood of them, are subject. The history of every form of dysphagy would make therefore a very long detail, comprising an account of most of the diseases of the mouth, throat, nasal cavities, pharynx, larynx†, and œsophagus, as well as of various accidental injuries of parts about the throat, and of many sorts of tumours within or near the mouth, the pharynx, or œsophagus.‡ In the present part of this work, the author enters into the consideration of the six following species:—

- | | | |
|----------|-----------------------|---|
| 1. _____ | DYSPHAGIA CONSTRICTA. | CONSTRUCTIVE DYSPHAGY. |
| 2. _____ | ATONICA. | ATONIC DYSPHAGY. |
| 3. _____ | GLOBOSA. | SPASMODIC DYSPHAGY, OR NERVOUS QUINSY. |
| 4. _____ | UVULOSA. | UVULAR DYSPHAGY. |
| 5. _____ | LINGUOSA. | LINGUAL DYSPHAGY. |
| 6. _____ | PHARYNGEA. | PHARYNGEAL DYSPHAGY. |

* See Magendie's Physiology, by Milligan, 2d edit. p. 238.

† Dr. Abercrombie has seen several cases of disease of the larynx in which the dysphagia was the prominent symptom, so as to lead to the supposition of disease of the œsophagus. In one instance the epiglottis was thickened and much elongated; the patient had no constant difficulty of swallowing, but was liable to sudden attacks of it during his meals, which threatened instant suffocation. In another case, the dysphagia was permanent, and combined with a hoarse husky cough and slight dyspnoea. The whole body of the larynx was very much enlarged and thickened; and some ulceration existed in it internally towards the œsophagus. In both cases the œsophagus was entirely healthy. See Abercrombie's Pathol. and Pract. Researches on Diseases of the Stomach, &c. p. 97. ed. 2.

‡ Instances are recorded by Valsalva and others of dysphagia from dislocation

[The several cases of dysphagia, arising from a diminution of the capacity of the œsophagus by disease of its texture, or from its being occupied or compressed by tumours of different sorts, are at first so similar in their symptoms and progress, that a successful discrimination of them is not always easy. In all of them, one of the earliest symptoms is a difficulty of swallowing solids, followed, after a time, by that of swallowing fluids. This inconvenience makes more or less rapid advance, and, if not relieved by medical treatment (which is too often impracticable), terminates in a fatal interruption of the function of deglutition. With the exception of spasmodic dysphagy, and cases of mechanical injuries of the jaw and parts about the mouth and throat, almost all the species of dysphagy come on very gradually, and with so little annoyance, that at first they are apt to be disregarded, more especially as the health is generally good, and the inconvenience in swallowing sometimes abates for a time, or even quite ceases. Nor in general can any defect be seen or felt in the mouth or pharynx; the food passes the isthmus of the fauces very well, and proceeds duly towards the stomach; but it soon rises into the mouth again, with a large quantity of saliva, unaccompanied by any effort of the stomach, diaphragm, and abdominal muscles. The patient again tries to swallow, and, perhaps, after repeated attempts, succeeds in getting the food into the stomach, in small quantities at a time. Thus the disease is allowed to go on unresisted for a long period. The kind of rumination, resulting from the inverted peristaltic action of the œsophagus, differs from common vomiting, inasmuch as the food is ejected without anxiety, indisposition, or cold sweats. Notwithstanding the difficulty of swallowing, the appetite often continues good, almost until the very approach of death.]

GEN. III.
Dysphagia.
General
symptoms
of Dys-
phagia.

of the os hyoides. In the *Journ. des Progrès*, &c. t. xiv. p. 250., a case of this kind is related, which was cured by reduction. Dr. Abercrombie gives the following particulars of another example: "An eminent medical man, now deceased, was liable to this accident, and I have seen him seized with it in an instant, while engaged in conversation. It produced slight difficulty of articulation, and total inability to swallow. He easily relieved himself by a particular movement of the parts with his hand, which had become familiar to him from the frequent occurrence of the accident." (*Pathological and Practical Researches on Diseases of the Stomach, Intestinal Canal, &c.* p. 102. ed. 2. 1830.) See another case in *Med. Gazette*, vol. iv. originally reported by Dr. Mugna in the *Annali Universali*. Sir Charles Bell had a preparation, exhibiting a projection of one of the horns of the os hyoides into the pharynx in consequence of ulceration. (*Surgical Obs.* p. 60.) Bleuland gives the particulars of a dysphagia produced by the pressure of an exostosis of the vertebrae upon the œsophagus. Sir Astley Cooper reports an example, in which the same consequence arose from a dislocation of the sternal end of the clavicle backwards. Aneurism of the aorta frequently causes dysphagia, which may exist long before the original disease is suspected. Dr. Abercrombie refers to a case, in which a probang was passed, under the idea of stricture of the œsophagus; it occasioned rupture of the aneurism, and almost immediate death. (*Op. cit.* p. 100.) Amongst numerous other circumstances, which may occasion dysphagia by pressure on the œsophagus, I may mention enlargement of the thyroid gland, bronchial glands, or glands in the posterior mediastinum; great distention of the pericardium. (*Bleuland de sana et morbosa Esophagi Structura*.) I dismiss from present consideration dysphagia from congenital malformations and imperfections of the pharynx, œsophagus, palate, &c. Sir Astley Cooper reports the case of an infant which, though born without an œsophagus, lived eight days. — Ed.

SPECIES I.

DYSPHAGIA CONSTRICTA.

CONSTRICTIVE DYSPHAGY.

DIFFICULTY OF SWALLOWING, FROM A PERMANENT CONTRACTION OF THE CÆSOPHAGUS.

GEN. III.
SPEC. I.
Diagnos-
tics.

SOMETIMES the diameter of the canal is diminished in particular parts by a thickening of the mucous membrane, fleshy excrescences, or fungous*, or scirrhus tumours. The same effect may proceed from tumours formed between the coats of the cæso-phagus.† Sometimes a scirrhus thickening of its coats, or of the cellular membrane connecting them‡, extends through its entire length; and sometimes it becomes contracted by the conversion of a portion of it into cartilage or bone. Besides these cases, there are other casual and symptomatic obstructions, which do not fall under our present survey, produced by hysteria, and other spasmodic affections; enthesiis, or the lodgment of foreign bodies in the canal; or external tumours, as in bronchocele, abscesses§, or aneurism of the aorta, pressing against its sides.

[The cæso-phagus is much less frequently the seat of disease, than the mouth and the pharynx, and especially than the stomach, and other parts of the digestive tube, below the diaphragm.¶ Its lining, like all other mucous membranes, is liable to be thickened by inflammation; the diameter of the passage is thereby lessened; the muscular fibres cannot act upon it with their usual power; and the conveyance of the food into the stomach is more or less obstructed. True strictures of the cæso-phagus, like those of the

* In Dr. Armstrong's *Morbid Anatomy of the Stomach, &c.* (Plate 8.) may be seen a representation of a stricture occasioned by the cardia being surrounded by a tumour, that had the character of fungus hæmatodes, or as he terms it, fungus encephaloides. The same author had seen another similar case; and both proved fatal before any degree of softening took place in the morbid substance. No similar formations were found in other parts. — EDITOR.

† See C. Bell's *Surg. Obs.* p. 60.

‡ See Armstrong's *Morbid Anat. fasciculus 2.*; pl. 7. fig. 2.

§ Mr. Carmichael has recorded two fatal examples of dysphagia, from abscess between the cæso-phagus and cervical vertebræ, where, from the situation and circumstances of the disease, as found on dissection, he conceives that the patients' lives might have been saved, had the collection of matter been discharged with a curved trocar. — See *Trans. of Association of Physicians of Ireland*, vol. iii. p. 170, &c. "A remarkable case occurred to Mr. George Bell, in which the dysphagia had existed so long that it was considered as an example of stricture of the cæso-phagus, and a probang was introduced. When this reached the part, which was very low down, it ruptured the abscess, and an immense discharge of matter took place, with immediate and permanent relief." (*Abercrombie's Pathol. and Pract. Researches on the Stomach, &c.* p. 99.) The same author quotes from Bleuland a case of fatal dysphagia from abscess between the vertebræ and upper part of the cæso-phagus. Collections of matter in the lungs may also press upon this tube, and ultimately form a communication with it; examples of which are referred to in Dr. Abercrombie's work, on the authority of Bleuland and Künze (*De Dysphagia*). — EDITOR.

¶ Andral, *Anat. Pathol.* t. ii. p. 244.

urethra, generally occupy but a small extent of the canal, and are for a long time attended with very little thickening of the adjacent parts. The derangement is in the inner membrane of the tube; there is no apparent disease of the tunica vaginalis gulæ; nor any degree of thickening of the glandular structure.* Strictures may occur in any portion of the tube; but their most frequent situation is immediately behind the cricoid cartilage at the termination of the pharynx. Sometimes the pharynx and beginning of the œsophagus is studded with scirrhus tumours of great firmness and whiteness, nearly closing the latter canal; while a general disposition to disease of its membrane is denoted by tumours of a similar nature lower down the passage. At the same time, the membrane, reflected over the glottis into the trachea, may be thickened, and even swellings of the above description present themselves within the latter organ.† Another form of scirrhus of the œsophagus is very analogous to the disease called the scirrho-contracted rectum; it involves all the coats of the tube, and, though it may affect the greater part of the passage, it generally commences either in the upper portion of it behind the cricoid cartilage, or far down near the cardia, where the structure is very glandular.‡ Scirrhus changes the texture of the œsophagus sometimes into a hard uniformly fleshy substance, and sometimes into a substance of a gristly nature, or intersected by membranes.§ Under such circumstances, the canal is always rendered narrower, and often nearly closed. The disease is also frequently complicated with ulceration, which is mostly seen either above or below the most constricted point, not exactly in it.|| A fact, meriting attention, is, that obstructions situated high up in the œsophagus, frequently give rise to ulceration of the lower part of it near the stomach, just as strictures in the urethra often produce ulceration of that canal towards the bladder. In the œsophagus, this kind of ulceration is most liable to occur when the obstruction has existed a long time: and the frequent retching is conjectured to be the occasion of it. Though ulceration does not generally attack the most constricted portion of the tube, it does so in particular examples, just as it does in the urethra, and this in such a manner that the obstruction is more or less removed. Relief only follows this event, however, in cases of common stricture of the mucous membrane; for when the disease is of a scirrhus nature, ulceration always proves an aggravation of the complaint, instead of a possible means of relief. Indeed, when the œsophagus has been rendered even more capacious than natural, by the effects of scirrhus ulceration, the continuity of the muscular action, by which the food is transmitted to the stomach, is interrupted, and a disease, very different from stricture, resembles it in its most essential circumstance, the incapacity of swallowing.¶

GEN. III.
SPEC. I.
D. Con-
stricta.

* Sir C. Bell, Surgical Obs. p. 80.

† Op. cit. p. 59.

‡ See Monro's Morbid Anat. of the Gullet, &c. p. 325.

§ Baillie's Works by Wardrop, vol. ii. p. 93.

|| Ibid.

¶ Sir C. Bell, in Surg. Obs. p. 62. According to Dr. Armstrong, when a softening of the scirrhus matter takes place, the muscular coat may suffer in the destructive process, and be attenuated. (*Morbid Anat. &c.* p. 54.) He adds, that, in general, it seems thickened, owing to the cellular texture connecting its fibres being in this state.

GEN. III.
SPEC. I.
D. Con-
stricta.

By ulceration of the œsophagus, preternatural communications may be formed between that tube and the trachea*, lungs†, or aorta.‡ The latter state may also be the result of disease first commencing in the great arterial trunk itself. § Here also the remarkable case of Admiral Wassenaer deserves to be mentioned, who, according to Boerhaave, died suddenly in the act of attempting to vomit soon after dinner, and whose œsophagus was found to have given way in the seat of an ulcer, so that all the food and drink taken at dinner had become effused in the cavity of the chest. A similar case, in which the œsophagus was perforated near the cardia, and the contents of the stomach, together with a lumbricus worm, four inches in length, were effused in the chest, is recorded in a modern work. ||

Dr. Baillie once met with a very unusual stricture in the œsophagus, arising from the puckered state of the mucous membrane, which, as well as the muscular fibres, was quite free from all morbid alteration.

Œsophagus
dilated
above the
obstruction.

When the diameter of the lower portion of the œsophagus is much diminished, the food often accumulates above the most contracted portion of the passage, which becomes dilated above the obstruction, and is sometimes converted into a kind of pouch, nearly as capacious as the stomach itself. Cases of this description are recorded by Blasius, Haller, and Mayo. ¶ In most examples, the dilatation is a general one, comprising the whole circumference of the tube. The formation of a *cul-de-sac* pouch at some particular point is more rare.** However, in Dr. W. Hunter's museum may be seen a pouch of this kind formed at the lower end of the pharynx, and extending down behind the œsophagus. Its origin was ascribed to a cherry-stone, which remained three days in the lower part of the pharynx, where it made a depression, in which the victuals afterwards lodged. In about five years, the pouch was large enough to hold several ounces of fluid. Its situation and size, particularly when distended with food, occasioned extreme difficulty of swallowing, by which the patient was ultimately destroyed. †† An example of a pouch at the lower and back part of the pharynx, and extending between the spine and œsophagus, so as to cause great difficulty of swallowing, is recorded by Sir C. Bell. After death the bag was not found to be covered by muscular fibres, as in Mr. Ludlow's case, but consisted of a protrusion of the inner coat between the strong muscular fibres of the pharynx. The patient

* Van Doeveren, Obs. Anat. Pathol. Lugd. 1789, obs. 2.; and Monro's Morbid Anatomy of the Human Gullet, p. 325. pl. ix.

† Bleuland, de Difficili Aliment. Depulsione, obs. 1. p. 48. fig. 112.

‡ Van Doeveren, obs. 2.

§ Meckel, Manuel d'Anat., tom. iii. p. 377.

¶ Revue Méd. Février, 1823. Some cases of softening and attenuation of the parietes of the œsophagus, followed by its rupture, are quoted by Andral. See Anat. Pathol., t. ii. p. 246. In every instance of this kind, hitherto reported, the tube gave way in the thoracic portion of the œsophagus near the cardia. The change is analogous to what has been considered by Hunter as the digestion of parts of the stomach by the gastric juice after death, and, indeed, it may depend upon the action of the same fluid, under particular circumstances. — ED.

¶ Med. Gazette, vol. iii.

** Meckel, Handbuch der Pathologischen Anat., t. ii.

†† Ludlow, in Med. Obs. and Inq., vol. iii, p. 85.

used to suffer as much from flatulence as from dysphagy, and, in consequence of the entrance of bougies into the opening of the sac, it was difficult to pass them.* Pouches of this description are sometimes the result of abscesses, which burst into the pharynx. An instance, in which there were two large sacs reaching from the pharynx along the sides of the œsophagus and trachea, and betwixt the former and the vertebræ of the neck, was seen by Sir C. Bell. The mechanical operation of these pouches, and their valvular communications with the pharynx, by which the food that insinuated itself into them was confined there, occasioned the patient's death from irritation and inanition.†

GEN. III.
SPEC. I.
D. Con-
stricta.

Cases of dysphagy, attended with the formation of the above kind of sacs, have been pronounced inevitably mortal.‡ This melancholy prognosis, it is to be presumed, would be fully warranted where the sac was the consequence of a scirrhus disease of the œsophagus; yet if Dr. Odier has taken a correct view of a case that occurred at Geneva, an example, in which the œsophagus was in a scirrhus state, and there was a large prominent pouch on each side of the neck, yielded to medical treatment.] The food which the patient, a young nobleman, took, commonly remained in these sacs an hour or two, and was then thrown up. Hemlock pills were prescribed, and a bandage applied to the protuberance. As soon as the pills were rejected, which, like the food, they were sure to be in an hour or two, their place was supplied by others, so as to let the hemlock constantly act on the seat of the disease. The patient soon experienced relief, and was gradually cured; the pouches disappeared; the aliments descended into the stomach; and the œsophagus recovered its former calibre.§

Singular
case ter-
minating
favourably.

[In stricture from chronic thickening of the mucous membrane, the patient feels, instead of actual pain, a sort of pressure or tightness, either in the course of the intestinal canal, or about the shoulders. He points out the exact part of the œsophagus in which the obstruction is situated; and the lower this point is, the greater reason has the practitioner to suspect a thickened state of the coats of the canal. The unpleasant sensations sometimes extend to the cardiac orifice of the stomach; but they are only felt when the patient makes attempts to swallow. In the early stage, the food does not return into the mouth till long after a meal, sometimes not till four or five hours afterwards. As the disease makes progress, however, the return is quicker, and the quantity of aliment brought up again larger.

Symptoms
of stricture.

* Sir C. Bell, *Surgical Obs.*, p. 64.

† *Surg. Obs.*, p. 71. With the assistance of Mr. Broxholm, of Sunbury, the editor removed from the late Mr. Champion, of Halliford, a tumour that was situated just below the occiput. Its consistence was that of cartilage, and its size that of a large orange. It had been growing many years. The reason which induced the patient at length to submit to an operation, was a serious difficulty of deglutition, which, he supposed, might depend upon the irritation of the tumour. After the removal of the swelling, the wound healed up very well, but no amendment took place in the power of swallowing, and the patient, who could hardly take any nourishment, for two or three weeks, died in a very emaciated state, about two months after the removal of the tumour. On dissection, a thickening of the parietes of the œsophagus was detected, attended with a very close stricture, and a pouch above it, containing some orange pips.

‡ Jourdan, in *Dict. des Sciences Méd.*, tom. x. p. 439.

§ *Edinb. Med. Convers.*, vol. iii. p. 193.

GEN. III.
SPEC. I.
D. Con-
stricta.

Lastly, when the case approaches its fatal termination, the food is often rejected almost as soon as the effort is made to swallow it.

Symptoms
of scirrhus.

Dysphagy, arising from scirrhus of the œsophagus, is attended with symptoms very similar to those of stricture. Pain, and inability to swallow solids, are the early symptoms. After a time the passage of fluids is arrested; they remain for a short time in the canal, and, distending it, create a sense of suffocation. At length, they are partly rejected by an inverted action of the œsophagus through the nose and mouth, and the rest passes down with a gurgling noise.* By careful and experienced observers, however, some circumstances have been noticed by which a scirrhus of the œsophagus is more particularly characterised. The patient is conscious of a dull pain and oppressive tightness, not only when he attempts to swallow, but at other times; and, if credit can be given to Wichmann, who first made this remark, the disagreeable sensation and the difficulty of swallowing cease in a great measure when the patient lies down upon his back. In addition to these particulars, Richerand's observation merits attention, namely, that a bougie is generally more easy of introduction, than in cases of stricture. The disease is reported to be sometimes met with in very young subjects as well as others, Percival having observed it in a child only thirteen years of age, and Wichmann in three children under eight. A question, however, here presents itself, namely, whether these were examples of true scirrhus disease of the œsophagus, or only scrofulous swellings of the lymphatic glands, which are well known to be particularly common in young subjects?]

Stricture
sometimes
indurated
and bony.

Where osthexia, or an ossific diathesis, is present, the stricture sometimes assumes a bony hardness; and Metzger gives a pitiable case of this kind, in which the passage was so narrow, that the unhappy patient perished altogether of hunger†! At times, indeed, the œsophagus has become entirely imperforate, either from the increasing contraction, or from the enlargement of internal or surrounding tubercles: of the former, Rhodius relates a singular case.‡ Examples of the latter have occasionally followed small-pox§, or strumous indurations.||

Remote
causes.

In a few instances half the length of the œsophagus has been completely gorged by a single fleshy or glandiform excrescence. One patient thus afflicted died of marasmus in the seventh month from the commencement of the disease, and in the prime of his life. The tumour reached from the middle of the canal to the cardia, and so thoroughly blocked it up that a probe was with difficulty passed into the stomach on examining the part after death.¶ An analogous case is recorded by Sir C. Bell.**

Of stricture of the œsophagus, it is often difficult to trace the remote causes. A neglected catarrh; common sore throat, small-pox; syphilis; a highly nervous or spasmodic diathesis; the smoke of tobacco††; the use of the *datura stramonium*‡‡; the abuse of

* See Monro's Morbid Anatomy of the Human Gullet, &c. p. 326.

† Advers. Med., vol. i. p. 175.

‡ Cent. ii. Obs. 46.

§ Act. Hafn., vol. i. obs. 109. Eph. Nat. Cur., Dec. ii. Ann. ix. obs. 45.

|| Mauchart, Diss. de Strumâ Œsophagi, hujusque Coalitu, &c. Tubing. 1742.

¶ Edinb. Med. Essays, vol. ii. art. xxiv.

** Surgical Obs., p. 79.

†† Eph. Nat. Cur., Dec. iii. Ann. i. obs. 79.

‡‡ Ibid., Ann., ii. obs. 68.

mercurial preparations; drinking too largely of coffee, or any other fluid immoderately hot or cold*; and an inflammation of the pharynx and œsophagus produced by swallowing soap-lees†, or other injuries; are various remote causes mentioned by writers. A temporary contraction of the œsophagus is said to have also been produced by worms in the stomach and intestines; and in one or two instances, apparently by worms lodged in the hepatic and common duct.‡ [With respect to some glandular swellings and tubercles, by which the œsophagus becomes obstructed, there can be no doubt that they depend upon scrofula. Of the causes of scirrhus of the pharynx and œsophagus, nothing certain is known. Under the head of *dysphagia constricta*, the learned author of this work has included many diseases of very different characters, as common stricture, from a thickening of the mucous membrane of the œsophagus; scirrhus and various sarcomatous indurations and thickenings of the parietes of the canal; and obstruction of it by glandular swellings and other tumours, either situated between its coats or growing from them.

GEN. III.
SPEC. I.
D. Con-
stricta.

No medicine has the power to remove a permanent stricture of the œsophagus arising from a thickened and contracted state of the mucous membrane. This is a very different case from spasmodic constriction of the canal, where no organic disease prevails, and the power of anti-spasmodic medicines, emetics, cold drinks, cold lotions, blisters, and alteratives, is considerable. In the instance of permanent stricture, the proper course is the use of the bougie, and where the attempt to dilate the part brings on violent spasm and great disturbance of the constitution, even caustic bougies may be tried, as recommended by Sir Everard Home. In general, however, the common bougie should be preferred, and the armed one employed only in formidable and unyielding cases. In proportion as the stricture gives way, the size of the bougie must be increased. If an example were to present itself, in which the dysphagy was known to depend upon the connection of one or more preternatural pouches with the pharynx or œsophagus, combined or not with a stricture or other disease of the passage, the means from which the greatest relief might be expected would be, I think, the introduction of an elastic gum tube, by which the food might be prevented from distending the pouch, and the stricture at the same time dilated. Whether also the obliteration of the pouch might be safely attempted by throwing an astringent injection into it, as suggested by Sir C. Bell§, future experience must determine. Elastic gum catheters are of important use in diseases of the œsophagus, not only as a means of effecting the dilatation of strictures, but as a contrivance for feeding the patient, without any action or disturbance of the diseased part itself. A proof of the accuracy of these remarks will be found in the particulars of Dr. Cumin's interesting case already referred to.

Treatment
of strictures
of the œso-
phagus.

In the early stage of a scirrhus or sarcomatous obstruction of the

* Bleuland, De sanâ et morbosâ Œsophagi Structurâ.

† Sir C. Bell, in *Surgical Obs.*, p. 83.; Dr. Cumin, in *Edinb. Med. Chir. Trans.*, vol. iii. part ii.; and a case under Dr. Renton, as quoted in *Abercrombie's Pathol. and Pract. Researches on Diseases of the Stomach*, &c. 2d ed. p. 98.

‡ Eschenbach, *Vermischte Bemerkungen*, i.

§ *Surgical Obs.*, p. 69.

GEN. III.
SPEC. I.
D. Con-
stricta.

Iodine.

Hemlock
and other
medicines.

Cured by
mercury.

Read's
stomach
syringe
may be
advan-
tageously
employed.

Descrip-
tion.

œsophagus, leeches, blisters, or issues on the throat may be tried*, together with an emetic, a course of the compound calomel pill, and occasional aperient medicines. The issues on the sides of the throat, and the use of bougies, Sir C. Bell assures us, will effect a cure when there is a mere thickening from common inflammation or scrofulous action. Were a case of this description to present itself to the editor, he would be disposed to give the internal and external use of iodine a fair trial. Except in the above examples, however, little benefit can be expected from this or any other plan. In these cases, as well as in those of common stricture, the patient should generally be fed by means of an elastic gum tube, passed from the nostril down the œsophagus.] In an early period of the disease, some benefit has been derived from hemlock and ammoniated copper. And sometimes mercury carried to the point of salivation†, has been found serviceable. Dr. Munkley relates one case of great severity, and even of some years' standing, in which mercury carried to the effect of ptyalism was perfectly successful.

A stomach syringe, for diluting and washing away various poisons introduced into the stomach, whether by design or accident, was [first suggested by Renault in his work on poisons. Dr. Monro afterwards gave drawings of instruments for the removal of laudanum from the stomach.‡ However, until Dr. Physic§ proved the utility of the stomach pump in the case of a child poisoned with laudanum, the invention gained little attention. As now perfected by Mr. Read and others], it appears to be admirably adapted to the joint object of enlarging the diameter of the œsophagus by a gradual pressure, and of conveying any quantity of liquid food that may be desirable. The instrument, as brought into notice by Mr. Jukes, consists of an elastic gum tube, a quarter of an inch in diameter, and two feet and a half in length, terminating in the lower extremity, or that introduced into the stomach, in a minute globe of ivory with various perforations, which for the present purpose must be omitted, and fitted at the upper end either by a screw or a plug to an elastic bottle of sufficient size to contain at least a quart of liquid, with a stop-cock fitted to it, as in the hydrocele bottle. Instead of the bottle, a pewter syringe may be adapted, of equal capacity, and used in the same manner.

The bottle or syringe being filled with warm water, and fitted to the tube already introduced into the stomach by the mouth or a nostril, on turning the stop-cock the water or other liquid may easily be forced into the stomach, and withdrawn by a reverse action: and hence laudanum, or any other poison capable of dilution, may be pumped up in a diluted state till the stomach is entirely unloaded; and liquid food may be introduced to any extent; at option. Mr. Jukes has tried the instrument on himself, as well as on various patients, with complete success, in one or two cases after ten drachms of laudanum had been swallowed for the purpose.||

* Sir C. Bell, Op. cit. p. 53, &c.

† Rush, Inquiries and Observations. Brisbane, Select Cases. Dobson, Med. Obs. and Inq., vi.

‡ Thesis de Dysphagia, Edinb. 1797.

§ Eclectic Repertory, vol. iii. p. 111. Also Gibson's Institutes of Surgery, vol. ii. p. 362.

|| Lond. Med. and Phys. Journ., No. 48. p. 334.

SPECIES II.

DYSPHAGIA ATONICA.

ATONIC DYSPHAGY.

DIFFICULTY OF SWALLOWING FROM DEBILITY OF THE MUSCLES OF DEGLUTITION.

THE external tunic of the œsophagus is muscular, and the muscular fibres are both transverse and longitudinal. The propulsion of the food from the fauces into the stomach commences in the action of the circular fibres of the pharynx, which contract in succession, and in a downward direction; and as this direction is continued to the muscular fibres of the œsophagus, the swallowed morsel is carried forward into the stomach by a progressive or peristaltic action.

Now, in all cases of debility in the muscles of deglutition, the contractile action of their fibres, and consequently their propulsive power, is lost or enfeebled, and a difficulty of swallowing must be the necessary consequence. [Persons of advanced years are most subject to dysphagy from paralysis of the œsophagus; though the disease sometimes occurs in the middle period of life, and even in youth. Thus, Dr. Monro records one instance of it, brought on in a country lad, nineteen years of age, by a previous febrile attack; and another case where it came on suddenly in a soldier, aged thirty-two, whose mouth was also drawn a little to the left side*, indicating the connection of the complaint with apoplexy. In atonic or paralytic dysphagy, patients generally swallow solids more easily than fluids, the conveyance of which into the stomach requires a greater effort and a more complete agreement amongst all the organs concerned. A probang may readily be introduced down the passage, without producing any aggravation of the complaint, as it does in cases of spasm. The patient cannot fix upon any particular point as the situation of obstruction, and he is not sensible of any pain, tightness, or feeling of weight, except at the periods of making an attempt at deglutition. When the paralysis is complete, nothing can be swallowed, and it is indispensable to feed the patient by means of a tube. When liquids pass down a certain way, and are then forced up, the paralysis probably occupies only a part of the œsophagus. Atonic or paralytic dysphagy may be the effect of apoplexy and other diseases, or injury of the brain; also of fevers; of exposure to cold and damp; and of disorder of the digestive organs. It is a symptom of the last stages of fever, and phthisis pulmonalis. In such cases a small quantity of any fluid frequently cannot be swallowed, because it does not give a sufficient stimulus; but deglutition will be executed if a large spoonful be given.† The treatment of atonic dysphagy must vary according to the nature of the cause. When the disease is the consequence of apoplexy, the means best calculated

GEN. III.
SPEC. II.
Economy
of deglu-
tition.

D. Ato-
nica.
Symptoms
of Atonic
Dysphagy.

Causes.

Treatment.

* Morbid Anat. of the Human Gullet, &c. p. 231, 232.

† Monro, op. cit. p. 234.

GEN. III.
SPEC. II.
D. Atonica.
Medical
treatment.

to lessen the difficulty of swallowing, are the same as those required for the relief of the original complaint. When the dysphagia has been associated with pain at the pit of the stomach, difficulty of breathing, palpitation, and flatulence, a cure has been accomplished by cordial volatile medicines, blisters, issues, and five grains of the pill myrrhæ comp. given every night at bed-time.*

In many cases, repeated blisters to the throat and chest, which stimulate from without, and tonic and astringent gargles, as of alum, catechu, rhatany, port-wine, and decoction of cinchona, which stimulate from within, will afford relief. Stimulating sialogogues may also be employed with advantage.

A draught of cold water drunk frequently during the day-time, and especially at night and morning, has also as a tonic been frequently useful. And if the habit be relaxed or irritable, the same tonic plan should be rendered general as well as local; and be especially combined with exercise, sea-air, sea-bathing, [electricity, galvanism, and the use of spirituous fomentations, as strong camphorated liniments, to the throat and neck. When no organic disease of the brain or spinal marrow is present, electricity is deemed one of the best remedies: several examples of its efficacy are given by Dr. Monro, and in one interesting case, the patient could only swallow when seated on the electrical stool. In some cases recorded by Tode and Wichmann, a cure was effected by the free exhibition of quassia.†] Hard study must be relinquished, and, if possible, anxiety of mind.

SPECIES III.

DYSPHAGIA GLOBOSA.

NERVOUS QUINSY.

DIFFICULTY OF SWALLOWING FROM WIND IN THE STOMACH, SPASMODICALLY COMPRESSED INTO THE FEELING OF A BALL ASCENDING INTO THE ŒSOPHAGUS, AND PRODUCING A SENSE OF STRANGULATION.

GEN. III.
SPEC. III.
Synonyms.

FROM this feeling of a hard ball in the throat, the species is in the present system distinguished by the specific name of *globosa*. It is peculiarly common to persons of a nervous or spasmodic temperament: and is hence called by Dr. Darwin and many other writers *globus hystericus*, and by Dr. Heberden *nervous quinsy*.

Most frequently it occurs as a mere symptom of the hysteric or hypochondriacal affection; and on this account is regarded as such alone by many nosologists. It is, however, often to be traced in sudden gusts of passion, as fear, grief, and anger, especially in young subjects, whose passions have never been disciplined; and at times exhibits so much violence as to threaten suffocation. In nervous habits, I have frequently met with it as a pure idiopathic

* Case by Dr. Carmichael Smyth, in Monro's Morbid Anat., &c. p. 231.

† See Dict. des Sciences Méd., tom. x. p. 444.

affection; and in a few instances, in persons who are not thus constitutionally predisposed to it.

Two clergymen of this metropolis, who bear an equally high character for pulpit eloquence, and have a very sufficient self-possession, have been occasionally under my care for some years in consequence of this complaint. One of them has most commonly been attacked during dinner; the regular action of the muscles, in swallowing, being converted, from debility of the organ, into the irregular action of spasm. The other received the first paroxysm while reading the service in his own parish-church, and was incapable of proceeding with it. In this case, the regular action of the muscles of the glottis, in speaking, excited irregular action in those of the œsophagus, from contiguous sympathy. And the effect was so considerable, that, when the clergyman came to the same passage of the liturgy on the ensuing Sunday, he was obliged to stop again, for he found he could not get through it. But he preached with as much fluency as ever; and this, too, with nothing more than a syllabus of his discourse before him. It was many weeks before he could summon courage to make another attempt in the desk; and his first effort was even then made in another church, and before another congregation. In this he was fortunate enough to succeed; and he has now entirely overcome the morbid habit.

In both these cases, I have found the most effectual remedy at the moment to be a tumbler of cold water swallowed gradually, and the application of a handkerchief dipped in cold water to the throat. The spasm thus counteracted soon ceases; and, in the cases before us, has returned not only less frequently, but with far less violence. Yet during the intervals, general tonics, a light diet at regular hours, and as much as possible horse exercise, have been had recourse to, and contributed their respective services.

The usual anti-spasmodics, ammonia, ether, camphor, assafoetida, and even laudanum, had formerly been tried, but, I was told, with little success.

When ether is had recourse to, whether in this or any other affection, the best means of dissolving it is a preparation little known in our own country, but which is introduced into the French Pharmacopœia* under the name of *Oleum de vitellis ovi*, obtained by evaporating the mixed yolks of eggs to about half; the oil is produced from this by pressure, but it must be afterwards filtered through paper to become refined.

GEN. III.
SPEC. III.
D. Globosa.
Singular instances.

Remedy
at the
moment.

General
treatment.

Oil of the
white of
eggs.

* Codex Medicamentarius, sive Pharmacopœia Gallica. Paris, 1818.

SPECIES IV.

DYSPHAGIA UVULOSA.

UVULAR DYSPHAGY.

SWALLOWING OBSTRUCTED OR TROUBLESOME FROM RELAXATION AND ENLARGEMENT, OR FROM DESTITUTION, OF THE UVULA.

GEN. III.
SPEC. IV.
How distinguished
from inflammation.

THE uvula is sometimes enlarged from inflammation; but, in such case, the disease, for reasons already stated, belongs to another class. In the inflammatory state, the uvula is hot, acutely painful, of a red or livid colour, and deviates, as it enlarges, from its proper form. In the species before us, its natural form and colour are scarcely interfered with, excepting that, as it grows larger and longer, it also grows paler. It is soft, relaxed, and œdematous.* [The affection is a chronic elongation and thickening of the part; an occasional consequence of syphilis, protracted fevers, and the use of mercury. It also sometimes proceeds in professional singers from immoderate exertion of the vocal organs. The patient has a sensation, as if the throat were blocked up by some largish body; the annoyance is considerable; and he is compelled to be continually coughing and swallowing his spittle. Some cases depend upon relaxation of the azygos, or levator muscle of the uvula.]

D. Uvulosa.
Medical treatment.

The complaint, therefore, in this variety, requires to be treated with spirituous and astringent stimulants. Gargles of alum, Cayenne pepper or port wine are the local applications commonly used, and they should be combined with cathartics and general tonics. [The remedy on which Dr. Granville chiefly relies is a gargle containing lunar caustic; the strength of which should be varied, according to the state of the uvula itself, and the nervous irritation in the system. Another useful application, mentioned by the same physician, is a powder composed of equal parts of muriate of ammonia and nitrate of potash, with a quarter of Cayenne pepper. This produces great immediate irritation, followed by copious salivation, and expectoration of thick mucus. The powder should be rubbed on with a camel-hair brush twice or thrice a day. Gargles, made with a proportion of sulphuret of potash, are in common use amongst professional singers, for improving the defect of their voices, connected with relaxation of the uvula; and Dr. Granville thinks the practice justified by analogy; sulphuret of potash being known to have in croup the power of converting the stridulous voice into a deep full tone, and being in fact the remedy for which Buonaparte awarded a prize of 1000 Napoleons, during the epidemic croup which raged in Paris in 1812.† If the disease

Sulphuret
of potash
gargles.

* In syphilitic ulceration of the soft palate, the uvula is often considerably enlarged, and so distended with serum, that it exhibits quite a transparent appearance. One gentleman, whom the editor lately attended, was in the habit of making a forcible expiration to throw the uvula in this state forward, for the purpose of its being inspected. Andral states, that œdema of the uvula may be idiopathic, connected with certain kinds of angina, or accompanying induration of the tonsils. (*Anat. Pathol.*, t. ii. p. 236.) — Ed.

† *Lancet*, No. 377. pp. 280, 281. According to Dr. Granville, who was for several years physician to the opera company, the uvula, in deep bass singers, is

do not yield to this plan, the elongated and pendulous part must be extirpated.

In a few rare instances, the uvula and even the tonsils become hard and cartilaginous; and, in such cases, the morbid portion must be cut away.

The uvula in its natural state appears also to be concerned in deglutition; and, [as one of its purposes is to examine, as it were, the nature of the aliment previously to its being swallowed, and by its sympathetic relations to excite an aversion in the gastric organs to substances not of a fit consistence and quality to be conveyed into the stomach, it is endued with a much higher degree of sensibility than the rest of the soft palate. By means of this quick sensibility, and the sympathy of the rest of the organs of deglutition with it, they are in all probability excited duly to perform the harmonious and successive actions by which the function of deglutition is accomplished.] And hence, when, from ulceration or any other cause, the uvula is lost or deficient, deglutition is rendered more or less troublesome, and even difficult. In this case, the healing art can administer nothing, and habit becomes the only physician. Examples are related, however, of so total a loss of the uvula, from gangrene, or the barbarous cruelty of cutting out the tongue, that the sad sufferer has been compelled to force the food in every meal into the œsophagus with his fore-finger.*

GEN. III.
SPEC. IV.
D. Uvulosa.
Medical treatment.

Consequence of the uvula becoming lost.

SPECIES V.

DYSPHAGIA LINGUOSA.

LINGUAL DYSPHAGY.

SWALLOWING OBSTRUCTED OR TROUBLESOME FROM PROTRUSION OR MAGNITUDE OF THE TONGUE.

THIS species exhibits itself under the two following forms or varieties:—

- | | |
|-----------------|--|
| α Exsertoria. | Tongue extended from the mouth, often |
| Lolling tongue. | with enlargement of its substance. |
| β Ranula. | Intumescence of the salivary glands or |
| Frog-tongue. | ducts. |

GEN. III.
SPEC. V.

It is necessary, as in the last species, to distinguish both these affections from inflammatory enlargements. [According to the editor's views of this subject, the only cases, which strictly accord

Congenital and chronic enlargements of the tongue.

thick and corneous, but thin and very pointed in the light, silvery, soprano singers. The observations of M. Bennati leave no doubt that the uvula and soft palate have considerable influence over the modulation of the voice; and he has demonstrated that these organs contract in proportional degrees to the ascent of the several musical notes. (See *Annali Universali* for June, 1830; *Bulletin des Sciences Méd.* for May, 1830; and *Lancet*, No. 377.)—Ed.

* The simple loss of the uvula would scarcely create so complete an inability to swallow as what is here described. Many persons who have lost the whole of the uvula from syphilitic ulceration continue to swallow without inconvenience,

GEN. III.

SPEC. V.

a D. Linguosa exsertoria.

Examples.

to the author's classification, are certain chronic*, and frequently congenital, enlargements of the tongue; for the examples produced by mercury and poisons, though included in this section, are in reality inflammations, and ought therefore to be arranged with other cases of inflammation. Galen mentions an instance of a prodigiously large tongue, which was neither in a scirrhus, œdematous, nor inflamed state.† Scaliger also refers to a man, whose tongue was of so extraordinary a size, *ut mendacii suspicio silentium indicat*.‡ Marcellus Donatus was acquainted with a merchant at Mantua who was in the same condition. § T. Bartholine quotes a case communicated to him by J. Valæus, in which a girl's tongue was as thick as her arm, and required to have a portion of it removed. The same author likewise describes a child, whose tongue, which was from the first larger than those of other children, became at length equal in size to a calf's heart. || Similar instances of spontaneous preternatural growths of the tongue are recorded by Bardet¶ and Maurant.** Another example of congenital enlargement of the tongue is described by Percy. The malformation had increased so much by the time the patient reached her eighteenth year, that it was impossible to see the sides and under surface of the tongue; and though she could speak and sing, she was obliged to push her victuals to the back of her mouth with her fingers in order to be able to swallow them. †† A very interesting case is that of Philibert Hænhumer, who was born with a very large tongue, pendulous from the mouth. No material increase of the part was afterwards perceived till the boy was eight years of age. At this period it was of a purple colour, and covered with a thick foul coat of mucus. It descended three inches below the chin; its apex was rounded: the teeth of the lower jaw were displaced by it; its base was two inches and a half thick; and the whole cavity of the mouth was filled by it: so that respiration could only be carried on through the nostrils, and nothing but liquids could be swallowed. The patient was relieved by the amputation of about a pound of the tongue, and the extraction of the misplaced teeth. ‡‡

Cutting out the tongue in the rude way referred to in the text, would certainly render deglutition more or less difficult; but would not generally be accompanied by the excision of the uvula; nor, if such excision took place, would the dysphagia depend much upon it, but upon the loss of the tongue. — ED.

* In scirrhus disease within the mouth, while the cellular tissue is becoming more and more thickened and indurated, the other tissues around it often have a tendency to waste away; they become less and less visible, and at length disappear, their place being supplied by a hard, homogeneous, white or greyish mass. (Andral, Anat. Pathol., t. ii. p. 237.) This fact has been particularly noticed by Sir Charles Bell, and also by Dr. Hodgkin, in his valuable paper upon adventitious structures. (See Med. Chir. Trans., vol. xv. p. 225.) In one case of scirrhus of the tongue, this organ, which was enlarged and singularly hard, presented nothing but a whitish substance, resembling the indurated cellular substance surrounding old ulcers of the skin, and in the midst of which some traces of slender, pale, muscular fasciculi were noticed, nearly obliterated by the pressure of the thickened cellular tissue. This was very exuberant on the dorsum and edges of the tongue, where it formed knobs, on several of which the mucous membrane was in an ulcerated state. — ED.

† Lib. i. cap. 9. de diff. morb.

‡ Exercit. 199. cap. 1.

§ Hist. Mirab., lib. vi. cap. 3.

|| Cent. 2. Hist. Anat. 22.

¶ Bulletin de la Soc. d'Evreux, No. 23. p. 67.

** Journ. de Méd. an 1762, tom. xv.

†† Dict. des Sciences Méd., t. xxvii. p. 246.

‡‡ MM. Percy and Laurent, vol. cit. p. 246.

In another very similar case, nearly an English pound of the tongue was extirpated with ligatures by Dr. Mireau. In this instance, not only did the four lower incisor teeth project with their edges forward in the horizontal position, but the alveolar process was also displaced.

It is justly remarked by MM. Percy and Laurent, that cases of the above description must all be referred to the principle, by which other *lusus naturæ* and extraordinary congenital enlargements of parts are produced; and that they are widely different from the instances more commonly recorded, which are specimens of glossitis, and generally occasioned by acrid, venomous substances, inflammation, or, what used to be termed, metastases. In many of the congenital cases, however, it appears, that a further increase of the tongue proceeded from the irritation of the part by the teeth of the lower jaw, and the consequently augmented determination of blood to it.

Besides the impediment to deglutition, the enlarged and protruded state of the tongue gives rise to a constant loss of saliva, with which the victuals are therefore not duly impregnated; digestion is impaired, and the health suffers.

The operation of removing the redundant portion of the tongue is the only means of relieving the above description of cases. Whether it should be done or not, must depend upon the degree of inconvenience caused by the swelling and size of the part. In cases of glossitis, on the contrary, this practice is quite improper; for, when they will not yield to the removal of their particular cause, and the employment of antiphlogistic treatment, one or more free and deep incisions in the dorsum of the tongue will generally afford prompt relief. The merit of making the efficacy of this method properly known to the surgical profession belongs to M. Delamalle, who wrote some interesting observations on the subject in the *Mém. de l'Acad. de Chir.*; but the practice was first introduced by Camerarius, Zacutus Lusitanus, and other older surgeons. In the modern periodical journals, we are constantly meeting with proofs of its success.* Sometimes, however, the necessity for deep incisions has been superseded by bleeding from the raninal veins, blistering the throat, and other antiphlogistic measures.† In one very singular instance, where the enormous swelling was confined to the left half of the tongue, and bounded by the middle line, the application of six leeches two or three times to the inflamed part produced a speedy subsidence of the swelling.‡ In all cases of obstructed deglutition by enlargement of the tongue, the use of elastic gum tubes for the conveyance of food and medicines into the stomach, under urgent circumstances, should never be neglected.§

M. Magendie, in the *Bulletin of the Philomathic Society of Paris*, for September, 1817, quotes the case of a Jew, who was able to double his tongue backwards, and plunge it with the greatest ease into the pharynx; and tells us of a boy who acquired the same power by imitating the Jew. The first efforts of the

GEN. III.
SPEC. V.
α D. Lingua exsertoria.

Should be discriminated from cases of glossitis.

Means of relief.

Singular instance of swallowing the tongue.

* See Martin's case, in *Edinb. Med. and Surg. Journ.* No. 92. p. 76.

† See *Edinb. Med. and Surg. Journ.* No. 93. p. 451.

‡ Graves, in *Dublin Hospital Reports*, vol. iv. p. 43.

§ See case by M. Manoury, *Journ. de Méd.*, tom. lxxxvi.

GEN. III.
SPEC. V.
α D. Lin-
guosa ex-
sertoria.

latter were unsuccessful: but at length he ruptured the frænulum, and a hemorrhage ensued, which, nevertheless, did not alarm him; for he found, from that moment, that he could pursue the imitation more perfectly; till, by continued repetition, he too acquired the singular faculty of swallowing, in the same manner, his own tongue, without the least inconvenience to his respiration.

Not always
enlarged,
though
elongated.

But the substance of the tongue, under this variety, is not always enlarged. M. Fournier knew a handsome young woman, sixteen years of age, who, although she had a long neck, had a slender and still longer tongue, insomuch that she could protrude and extend it to her bosom without stooping her head. And he tells us of another female whom he saw at Berlin, with a tongue astonishingly wide, but as thin as a cat's. When this woman laughed, the tongue covered the whole of her mouth, and hung out like folds of drapery. It was always cold, and communicated a most frigorific sensation to the hand of another person.*

β D. Lin-
guosa
ranula.
Frog-
tongue.

[The Ranula, or *frog-tongue*, is a tumour under the tongue, consisting sometimes of a dilatation of the excretory duct of the sublingual gland; sometimes of a dilatation of the excretory duct of the submaxillary gland. The first case is denoted by its globular shape, and its situation exactly under the tongue; the second by its oblong figure, and its lying towards the side of that organ. The disease is most frequent in children; but is also met with in adults. The contents of the swelling are generally a viscid transparent fluid, like white of egg. The disease arises from an accidental obstruction or obliteration of one of the above-mentioned ducts. When neglected, the tumour sometimes becomes so large that it occupies the greater part of the mouth; forces the tongue backwards; impedes suction, mastication, and deglutition; obliges the patient to breathe entirely through the nostrils; propels outwards the canine and cutting teeth; and even forms a prominent swelling below the chin.†

Treatment.

When the tumour is recent, and not very large, it may be cured by making a free opening in it, and maintaining the aperture for some time by means of a small tube or tent. When, however, the swelling is of a considerable size, and of long standing, and the cyst is thick and indurated, a portion of the latter part must be removed.]

The irritation and enlargement proceed occasionally from a morbid secretion of calculous matter. Hence, when a ranula has been opened, the surgeon should always examine with a probe whether any calculous matter is lodged in it; and, if it be so, it should be at once extracted. M. Fournier records one case, in which a stone formed under the tongue, and at length acquired the size of a pigeon's egg, accompanied with great pain and profuse salivation: a cure was effected by removing the morbid concretion.‡

* Dict. des Sciences Médicales, art. CAS RARES.

† See Case by Petit, Traité des Mal. Chir., tom. i. p. 184.

‡ Dict. des Sciences Médicales, art. CAS RARES.

SPECIES VI.

DYSPHAGIA PHARYNGEA.

PHARYNGEAL DYSPHAGY.

SWALLOWING OBSTRUCTED BY A POLYPOUS EXCRESCENCE IN THE PHARYNX.

THE variety, produced by a polypous excrescence in the pharynx, is added. Sir Astley Cooper tells us, that he has seen two cases of it; one in a Spanish gentleman who had previously consulted various surgeons at Paris, but apparently without success. It was of the colour of the mucous membrane of this portion of the alimentary tube, beginning from the fold over the palato-pharyngeus, and hanging down like a sausage into the pharynx. By great efforts the patient could regurgitate it into his mouth. A ligature was passed round its root without much difficulty, and it separated in eight days. The second case was similar in appearance, but not quite so large, and grew still more from the root of the tongue. It was removed in the same manner, and with equal success.* [The particulars of another instance of a difficulty of swallowing, from the growth of a polypus from the lining of the pharynx, were communicated, two or three years ago, by Kergaradec to the Royal Academy of Medicine at Paris.† The true cause of the dysphagia, which had been treated as a nervous affection, was only made out after death, when the parts were dissected.]

GEN. III.
SPEC. VI.

GENUS IV.

DIPSOSIS.

MORBID THIRST.

THE DESIRE FOR DRINKING EXCESSIVE OR IMPAIRED.

BETWEEN the present and the ensuing genus, entitled LIMOSIS, or MORBID APPETITE, there is a close natural connection, though their position is in different and even distinct organs.

GEN. IV.

The sense of hunger is well known to be seated in the stomach; and that of thirst in the mouth and fauces. [Thirst is a feeling of a still more urgent kind, and requiring instant satisfaction still more imperiously, than hunger; particularly in warm climates, or when any of the watery secretions are augmented, as in dropsy and diabetes. It is one of the most distressing symptoms in

Design of
thirst and
hunger.

* Lectures on Surgery, vol. ii. p. 356. 8vo. 1825. This addition was found amongst Dr. Good's papers, subsequently to the completion of the third edition.
— Ed.

† See Dict. de Méd. et de Chir. Pratique, art. DYSPHAGIE.

GEN. IV. fevers and inflammatory complaints, especially in inflammation of the stomach. Hot spices, saline substances, and, in particular, common salt, increase it, as do all causes augmenting the different secretions. The end of drinking seems, therefore, to be for the repair of the losses of our fluids. If thirst be not satisfied, a general irritation comes on; the sensation of dryness in the mouth and fauces increases, and is accompanied with a burning feel, and a quickened pulse. But, although thirst appears at first very oppressive, drink is by no means so necessary to the continuance of the life of every animal, as food. Several species of warm-blooded animals, as mice, quails, parrots, &c., can subsist without drinking; and individuals of the human race have been known, by perseverance, to conquer the sensation of thirst. Sir G. Baker has recorded a memorable example, in the Transactions of the College of Physicians, of a man, who lived in perfect health for many years, without drinking.

Their
differences.

Thirst and hunger may be compared to two sisters, united together for the common purpose of rendering the animal attentive to the preservation of its own existence. When their call is obeyed, they are a source of pleasure; when it is neglected, or resisted, they are a cause of great and even fatal suffering. But, in the production of these two very different results, pleasure and pain, thirst is far more energetic and intense than hunger. The quickness with which the taking of drink appeases the first of these sensations, contrasted with the slowness with which solid aliment is necessarily conveyed into the stomach, perhaps, may tend in some measure to explain the really greater enjoyment generally felt in quenching thirst than in satisfying hunger.

In the great object for which thirst and hunger are instituted, namely, the nourishment of the body, the importance of the latter sensation is sometimes represented as greater and more evident than that of the second. Solid aliment, it is said, yields the essential constituent parts of the blood; and the utility of drinks, in relation to this fluid, is not always so manifest. Yet, how can this view be adopted, unless we shut our eyes to the large proportion of aqueous fluid in the blood, and to the immense quantity of water continually thrown out of the circulation by the lungs, kidneys, skin, and the secreting organs in general? The cessation of pleasure, however, the crisis to which the satisfying of either of these sensations leads, it is true, is less strongly marked with respect to thirst, than hunger; and the disgust, experienced from cramming the stomach with solid food, can scarcely be said to be producible by taking a redundant quantity of beverage. Indeed, with regard to thirst, drunkards appear incapable of reaching that point which, in the use of solid aliments, may be regarded as satiety. This difference probably depends upon the stomach immediately ridding itself of drink, while chymification requires the food to be retained in it a considerable time. Hunger and thirst differ strikingly from one another in the time and situation of their development, as well as in their local and general phenomena. Thirst, contrasted with hunger, comes on suddenly, and, if it be not quenched, it creates a state of suffering,—real pain; it is not at all like what, in relation to hunger, is called an appetite, which enters into the class of agreeable sensations. In thirst, the mouth,

and especially the throat, are affected; in hunger, the stomach is the seat of uneasiness. Thirst, even when not very ardent, is accompanied with a true local and general excitement; while hunger, if at all protracted, occasions chilliness, paleness, and a disposition to fainting. The differences between hunger and thirst, when long continued, and assuming the character of diseases, or rather, between the effects of a total abstinence from drink and those of a complete abstinence from solid food, are still more strongly marked. To use a term employed by Brown, the state of *sthenia*, of erethismus, of dryness, and of local and general heat; the increased activity in the general and capillary circulations; the energy of the external senses, of the whole nervous system, and of the muscular organs; the results of thirst, form a very manifest contrast to the prostration of every power of the constitution, to the languor of all the functions, and to the true adynamia, produced by unappeased hunger. Death, which is the end of both these scenes, takes place much sooner from thirst, and the more so, because no remission occurs in the cruel and progressive course of its symptoms. Death from want of solid food always comes on more tardily, and its phenomena, which are characterised by irregular paroxysms, are attended with remissions of greater or less duration.

GEN. IV.

Difference
in the
effects of
extreme
thirst and
hunger.

But nothing is a better illustration of the differences between hunger and thirst, than the influence of disease over them. Who does not know, that one of the first effects of most diseases is to augment thirst, and to make the patient need a larger quantity of drink, while the appetite is more or less completely annihilated, and a necessity for abstinence produced? Throughout the course of diseases, while thirst continues, the appetite cannot return; and even if it were to do so, in this state of things, it would only be a fallacious indication of a fictitious want, that could not be safely satisfied. The decline of indisposition, and the approach of convalescence, denoted by the subsidence of thirst, have also, as one of their surest harbingers, the return of appetite. And with regard to therapeutic means, is it not equally a fact, that beverages which assuage thirst create appetite? that certain medicines, particularly antispasmodics and opium, which diminish hunger, excite a good deal of thirst? and, lastly, that all generous alcoholic wines which appease or delude the sensation of hunger, produce at the same time quite an opposite effect upon thirst?

Influence
of diseases
upon them.

Though the seat of thirst is now generally assigned to the mouth and fauces, some physiologists so far dissent from this doctrine as to refer the seat of thirst partly, also, and even principally, to the stomach. They argue, that, as this organ is the instrument of hunger, it must, by analogy, be likewise that of thirst; and that heating drinks and food, which merely glide over the throat produce thirst chiefly by their action on the stomach, as is proved by the circumstance of thirst not being felt till digestion is going on in the stomach, and long after their application to the pharynx. They further argue, that the thirst, following a meal, is actually quenched by beverages which merely touch the parts in the mouth and throat momentarily, but remain more or less time in the stomach. They likewise take into consideration, that various

Seat of the
sensation
of thirst.

GEN. IV. aliments of mild qualities, like farinaceous substances, which do not at all irritate the pharynx in deglutition, excite a considerable degree of thirst after their introduction into the stomach. The only means of relieving thirst, so brought on, is to swallow plenty of fluid; for every other attempt at deceiving the patient's feeling is to little purpose.

It is conceived that other observations tend to raise additional uncertainty respecting the true seat of thirst. Dropsical diseases, diabetes, profuse suppuration, copious hemorrhages, &c. are cases in which the animal economy is deprived of a large quantity of fluid, without the physical state of the pharynx or stomach appearing to be more particularly affected, than any other part of the body. Nay, it is asserted, that some rare examples have been met with, in which an irritation, a dryness, and redness of these organs were not accompanied with the least degree of thirst; and it is remarked that, whatever may be the cause and intensity of this sensation, it may certainly be appeased by the warm bath, clysters, and the injection of liquid into the veins; plans which replenish the system with fluids, but have no specific action either on the throat or stomach.

Although these reflections seem to the editor to bear more upon the question concerning the causes of thirst, than that relating to its seat, they are highly interesting, confirming the fact, that the present subject is involved in a great deal of mystery, and pointing out the obscurity that attends our internal sensations, compared with such as are derived from without.

Causes of
thirst.

Many vague hypotheses have been suggested, as explanations of the immediate cause of thirst. The least plausible ones must here be passed over in silence. By some physiologists, thirst is imputed to the dryness of the nervous papillæ of the pharynx, arising from a diminution of the salivary and mucous secretions. Yet, in numerous cases, thirst exists quite independently of a want of moisture in the pharynx; while such beverages as are calculated to prevent the dry state of that organ do not always succeed in quenching thirst; and, in many instances, the best means of assuaging it, whatever may be its violence, are certain general therapeutic plans, which cannot possibly operate by moistening the pharynx, or its nerves.]. In thirst, there is, perhaps, always a sense of dryness in the fauces; and yet dryness of this organ does not appear to be the cause of thirst; at least, the intensity of the feeling does not appear to depend on the intensity of the dryness: for there is sometimes but little thirst, where the tongue, to its very roots, is covered with a thick and dry crust, as in the acme of continued fevers: while it is often vehement under the influence of violent passions, and intolerable on a surcharged stomach, when the tongue and fauces have no dryness whatever.

Dryness of
the fauces.

Diminu-
tion of the
aqueous
part of the
blood.

[Another class of physiologists, considering, on the one hand, the purpose of thirst, which leads us to take only such fluids as are fitted to dilute the blood and the secretions: and observing, on the other, the powerful influence that copious evacuations, by perspiration, diarrhœa, diabetes, and serous extravasations, have over this sensation, attribute the immediate cause of thirst to the abstraction of the aqueous part of the blood. Bichat, who was inclined to adopt this theory, conjectured that the introduction of water into

the veins would, by mixing with the venous blood, have the effect of quenching thirst in the same manner as drink taken in the ordinary way. This conjecture is now ascertained to be a fact. By injecting water, milk, whey, and other fluids into the veins, Baron Dupuytren has frequently appeased the thirst of animals subjected to experiment, and long exposed to a burning sun. By varying such experiments with liquids known to be agreeable or disagreeable to dogs, he found, that the animals derived from these liquids, so employed, the same sensation of taste as if they had been given by the mouth. In fact, when milk was thrown into the jugular vein, the dogs made a lapping motion, just as if they were really taking the milk up with their tongues.

GEN. IV.

Dupuy-
tren's ex-
periments.

Some analogous experiments were made by Professor Orfila. In his valuable researches on Toxicology, he had frequent occasion to tie the œsophagus in dogs, in order to hinder the expulsion of poisons which they had swallowed. For the purpose of appeasing their thirst, excited by the fever resulting from the extensive wound in their necks, he injected water into their jugular veins. This method of quenching thirst, the only one practicable while the œsophagus was tied, was performed in a great number of instances, and always gave immediate relief. The blood of animals which had been long in a thirsting state, was also submitted to distillation, and the diminution of its aqueous part was always found to be in proportion to the length of their abstinence from drink.* The principal fact, interfering with the foregoing theory, is that of the frequently sudden production of thirst, without any previous abstinence from drink, sufficient to justify the suspicion of the watery part of the blood having been in any way particularly lessened. But, although much obscurity prevails concerning the efficient cause of hunger and thirst, their final cause is sufficiently obvious: they are the means, by which we are warned of the necessity of supplying the system with materials requisite for its existence. They belong to that class of actions which are termed appetites; where an effect, which is a compound of a physical and a mental operation, is connected with an evidently useful purpose in the animal economy.†]

Orfila's ex-
periments.

The common modes of quenching these agonising sensations are well known to be eating and drinking: yet, when these cannot be indulged in, other modes may answer as a substitute. Thus, violent pressure against the coats of the stomach, whether externally or internally, is well known to take off the gnawing sensation of hunger; and stimulating the fauces, to take off the burning faintness of thirst. It is on this last account that chewing a mouthful of hay, alone, or merely moistened with water, proves so refreshing to a tired horse, and is found so serviceable when we dare not allow him, in the midst of a long stage, to slake his thirst in the natural way. Savages and savage beasts are equally sensible of the benefit of pressure in the case of hunger, and resort to it upon all occasions where they have no opportunity of taking off the pain in the usual way. The manis, or pangolin, that swallows its food whole, will swallow stones, coals, or any other substance if

These
sensations
how
quenched.Pressure
employed
to deaden
hunger by
savage
beasts,

* See Dict. des Sciences Méd., tom. li. p. 469.

† See Bostock's Physiology, vol. ii. p. 531.

GEN. IV. it cannot obtain nutriment; not that its instinct deceives it, but for the purpose of acquiring such a pressure as may blunt the sense of hunger, which it finds intolerable. Almost all carnivorous beasts pursue the same method; and a mixed mass of pieces of coal, stone, slate, and earth, or other hard materials, is often met with in the stomach of ostriches, cassowaries, and even toads. The same by barbarous tribes. The Kamtschadale obtains the same end by swallowing saw-dust; and some of the northern Asiatic tribes, by a board placed on the region of the stomach, and rudely laced behind with cords, drawn tighter and tighter according to the urgency of the uneasiness. In our own country, we often have recourse to a similar expedient, and only exchange the tightened stomach-board for a tightened handkerchief.

Overcome by emotions of the mind. It is possible, therefore, temporarily to overcome these natural sensations without the natural means: and the passions of the mind have as strong an influence on both as any of the substitutes just adverted to. Thus both are completely lost beneath the sudden communication of news that overwhelm us with grief or disappointment. So Van Helmont tells us, that, happening to dislocate his ankle while walking with a good appetite to dine with a friend, his appetite immediately forsook him, but returned as soon as the joint was replaced, though the pain continued for some time with little alteration. There are some passions, however, as those of rage and eager desire, which, while they repel the sense of hunger, increase that of thirst. But they prove equally the close connection of both feelings with the state of the nervous system generally; and the strong and extensive influence which is sympathetically exercised over them.

Morbid thirst rarely treated of. MORBID THIRST, as a genus, is new to the science of Nosology, and hence the two species, which belong to it, have hitherto, in almost every instance, been separated from each other, and thrown loosely into remote parts of the classification. Dr. Young, however, offers an exception to this remark: for, with his accustomed accuracy, he has united them under a common head. The genus being new, it has hence been necessary to create a new name for it: and that of dipsosis, from *δῖψω*, "to thirst," has appeared not only most pertinent, but most consonant with the nomenclature in common use, which has naturalised various terms derived from the same root; as adipsia, polydipsia, phobodipsia, this last being a synonym for hydrophobia.

The two species of the genus are the following:—

1. DIPSOSIS AVENS.

IMMODERATE THIRST.

2. ——— EXPERS.

THIRSTLESSNESS.

SPECIES I.

DIPSOSIS AVENS.

IMMODERATE THIRST.

CONSTANT DESIRE OF DRINKING; WITH A SENSE OF DRYNESS
IN THE MOUTH AND THROAT.

SIMPLE thirst is a natural, immoderate or inextinguishable thirst, a morbid feeling. Yet even the latter is less frequently an idiopathic disease, than an individual symptom of some other complaint, or some peculiar state of body, the removal of which will alone effect its cure. [Whether, in the strictest sense of the expression, immoderate thirst is ever an original idiopathic disease, appears to the editor very doubtful; and, in the cases where it has been assumed to have been so, probably, this inference was drawn merely from the circumstance of no other disorder in the system being apparent. How often, however, is the practitioner compelled to observe only symptoms, and remain ignorant of their primary cause!]

GEN. IV.
SPEC. I.

I have at this time under my care a young lady of about thirteen years of age, in other respects in good health, who is tormented with a thirst so perpetual, that no kind or quantity of beverage seems to quench it for more than a few minutes. Emetics and purgatives have been tried in vain. Squills and other nauseating expectorants seem to promise more success. It has now lasted for several weeks.

Striking
instance
of idio-
pathic
dipsosis.

The most grateful palliatives are the vegetable acids, and especially acescent fruits, and a decoction of sorrel-leaves (*rumex acetosa*, Lin.) slightly inspissated with gum-arabic or some other mucilage, and sweetened to meet the palate. Liquorice, which, among the Greeks, had so high a reputation for quenching thirst as to be honoured with the name of *οδιψον*, "the thirst extinguisher," has little or no effect. And it is probably true, as suggested by Dr. Cullen, that it only acts in this manner when the root is well chewed, by which means the salivary excretories become stimulated to an increased secretion of fluid.

In a foreign medical miscellany we have reported to us a case of the same kind, brought on by drinking a cold beverage during the paroxysm of a fever, that continued for more than a twelvemonth.* And in another foreign journal, we have an account of this disease as epidemic among children.†

The quantity actually drunk is sometimes enormous. Four hundred pints of wine and water have, in some cases, been swallowed daily.

Quantity
drunk
sometimes
enormous.
Symptom-
atic thirst.

As a symptom, excessive thirst is chiefly found in the hot fit of fevers, in dropsy, dysentery, diabetes, diarrhœa, and other discharges. It is also frequently excited in wet-nurses, as soon as the

* Heuermann, Bemerkungen, i. p. 28.

† Gazette de Santé, 1777, p. 93.

GEN. IV.
SPEC. I.
Dipsosis
Avens.

child takes hold of the nipple ; but perhaps is felt most intolerably under the torture inflicted to compel a confession of guilt ; in which case it is said to form the worst part of the suffering. The agony of violent thirst, brought on by bodily suffering, is well depicted in the description of the fatal scene in the memorable Black Hole of Calcutta.*

SPECIES II.

DIPSOSIS EXPERS.

THIRSTLESSNESS.

CONSTANT WANT OF THIRST.

GEN. IV.
SPEC. II.

Some animals never drink.

Thirstlessness in other animals a disease.

Examples.

CONSIDERING that thirst is a natural feeling, and contemplating the vehemence of this feeling when extreme, it is not a little extraordinary, that instances of its total absence should ever occur. Yet there are many animals, and warm-blooded animals too, that never require drink, and consequently never thirst; as mice, quails, parrots. Here, however, the want of thirst, or desire to drink, is a natural condition in the economy of these animals. In man, and animals constituted like man, with a constitutional proneness to thirst, and an instinctive urgency to quench it by drinking, this want of desire can never take place without disease. [Whether this, however, should be referred to disease, or a natural idiosyncrasy, may be questionable. While immoderate thirst, unattended with any other manifest disorder of the constitution, has been set down by nosologists as an original idiopathic disease, thirstlessness, we perceive, is not viewed in this light, but regarded here as an effect of disease. In opposition to this conclusion, it should be recollected, that some individuals have lived, seemingly in good health, without drinking. M. Bouffard records one instance, in which a young lady, twenty-two years of age, passed whole months without drink, yet appeared to be well in every other respect.† Facts of the same kind are reported by Sir G. Baker.‡] Cases of thirstlessness are not by any means frequent. Sauvages mentions two instances that occurred to himself. In the one, the patient, a learned and excellent member of the Academy of Toulouse, never thirsted, and passed months at a time without drinking, even in the hottest part of the summer : in the other, the patient, who was a female of a warm and irascible temperament, abstained from drinking for forty days, not having the smallest degree of thirst through the whole of this period.§ Neergaard, as quoted by Blumenbach, has furnished us with other examples|| ; and M. Fournier informs

* Annual Register, 1758.

† See Dict. des Sciences Méd., tom. li. p. 465.

‡ Med. Trans., vol. ii. p. 265, &c.

§ Nosol. Method., vol. i. p. 770, 4to edit.

|| Blumenb. Physiol., sect. xxi. 322. J. W. Neergaard, Vergleichende Anatomie und Physiologie des Verdauungswerkzeuge, &c.

us, that one of his most intimate friends reached, not long since, the age of forty-eight, without ever having drank of any fluid, or been thirsty; but he was accustomed to eat voraciously. It is singular, that he should have died of *dropsy* of the chest; apparently the result of a second bleeding for some accidental malady.*

GEN. IV.
SPEC. II.
Dipsosis
Expers.

GENUS V.

LIMOSIS.

MORBID APPETITE.

THE APPETITE FOR FOOD IMPAIRED, EXCESSIVE, OR DEPRAVED.

THE sensation of hunger, as observed already, is seated in the stomach; and, like that of thirst, is a natural or instinctive desire. It may, however, become diseased, and lose its natural character; and this in various ways, and accompanied with various sets of symptoms, each of which lays a foundation for a distinct species. Like the species of the last genus, however, they have hitherto been omitted in most Nosologies, or loosely scattered over different parts of the classification, though they evidently belong to a common family, and should be contemplated in a concentrated view. It is for this purpose, they are now united under the banners of a single genus, to which I have ventured to give the name of LIMOSIS, from *λιμος*, "hunger," being the root of various terms current in the medical vocabulary; as, bulimia, alimia, alimon, alimonia, alimantum; though the last three have been commonly mis-derived by the lexicographers from *alo*, "to nourish;" unless *alo* itself be from the same source.

GEN. V.

The species that properly appertain to it are the following:—

- | | |
|--------------------|--------------------------|
| 1. LIMOSIS AVENS. | VORACITY. |
| 2. ——— EXPERS. | LONG FASTING. |
| 3. ——— PICA. | DEPRAVED APPETITE. |
| 4. ——— CARDIALGIA. | HEART-BURN, WATER-BRASH. |
| 5. ——— FLATUS. | FLATULENCY. |
| 6. ——— EMESIS. | SICKNESS, VOMITING. |
| 7. ——— DYSPEPSIA. | INDIGESTION. |

SPECIES I.

LIMOSIS AVENS.

VORACITY.

INSATIABLE CRAVING FOR FOOD.

THIS affection may be produced by a sense of faintness and inanition, without any known cause of exhaustion; probably in consequence of some organic error in the stomach by gluttony, or

GEN. V.
SPEC. I.

* Dict. des Sciences Médicales, art. CAS RARES.

GEN. V.
SPEC. I.

an habitual indulgence in large and frequent meals; or by exhaustion from hard exercise, long fasting, fevers, or excessive discharges: thus offering the three following varieties of this species:—

- | | |
|---|--|
| α Organica. Canine appetite. | From a feeling of faintness and inanition. |
| β Helluonum. Gluttony. | From an habitual indulgence in large and frequent meals. |
| γ Exhaustorum. Hunger of exhaustion. | From exhaustion, as the consequence of hard exercise, fevers, or excessive discharges. |

α L. Avens
organica.
Canine
appetite.

There are many persons who from birth, or a particular period of life, without any habit of indulgence, are capable of taking into the stomach an enormous quantity of food, and cannot be satisfied without it, from a constant sense of faintness and inanition; and who by no means increase in bulk in proportion to the quantity swallowed; being often, on the contrary, slender and emaciated.

Supposed
causes.

It is difficult to account for this effect in every case; but, there is great reason to believe, that, in general, it depends upon some error in the structure or position of the stomach, by which means the food passes out of this organ as soon as it is introduced into it. [A very curious example of an approach of the stomach to the perpendicular direction, attended with a singular structure of that organ, has been lately recorded by Mr. Hart; but, unfortunately, the particulars of the appetite and digestion in this subject could not be ascertained.*] Ruysch gives a case, in which the diameter of the pylorus was considerably enlarged from relaxation; and there are others, in which it has been changed from its natural to a lower or dependent position, in consequence of the left side of the stomach being elevated by a dropsy of the ovarium, or an enlargement of the liver. The existence of a double stomach, or of an immediate insertion of the ductus communis choledochus into the stomach, though noticed as causes by Blasius and Bonet, is more doubtful.† In the hunger of general exhaustion, forming our third variety, we know it to be produced by the secretion of an extraordinary quantity of gastric juice, by which the food is digested

* See Dublin Hospital Reports, vol. iv. p. 326, &c.

† In a galley slave, noted for voracity, Vesalius ascertained, that the bile was poured directly into the stomach. The stomach of the celebrated glutton, Tarrare, of whom some particulars will presently be detailed by Dr. Good from the history published by M. Percy (see *Mém. sur la Polyphagie*, Journ. de Méd. &c. par MM. Corvisart, Leroux, &c., t. ix. p. 87.), was remarkable for its great capacity. In the instance recorded by Cabrol, in which the bowels were only three feet long, the size of the stomach was prodigious. On this subject, Professor Andral puts a judicious question; viz. whether the extraordinary dimensions of the stomach, sometimes noticed in the bodies of persons known to have been gluttonous eaters, may not be the simple effect of the immoderate quantities of food habitually introduced into that organ, and not the primary cause of the voracious appetite itself? In this case, it might be expected that the stomach would increase in bulk, like all other parts, whose functions are in a state of considerable activity. (See Andral's *Anatomie Pathol.*, t. ii. p. 192.) However, in one remarkable instance of extraordinary congenital bulimia, reported in a modern work, the stomach, instead of being increased in size, was found after death particularly small, though the individual lived to the age of thirty-two. (See Broussais, *Annales de la Méd.*, Oct. 1832.) — Ed.

almost as soon as it reaches the digestive organ. That mimic feeling which is commonly known by the name of *false appetite*, was supposed by Galen to be produced by some acrimony in the stomach. Upon the theory of Dr. Wilson Philip, its real cause should be an excessive secretion of gastric juice itself; for it is the flow of this material over the interior of the tunic of the stomach, that, according to him, excites the sense of hunger.* It should, however, be recollected, that, if this sensation be not indulged within a few hours, and in weak stomachs within a much shorter period of time after its commencement, it suddenly dies away, and is succeeded by anorexy; although it is reasonable to suppose, that there is then in the empty stomach a much larger quantity of the secretion.

[Some cases of voracious appetite seem explicable on another principle, connected with the theory frequently entertained of the proximate cause of hunger, namely, that it is a sensation excited in the stomach by sympathy with the wants of the constitution at large. Thus it is often noticed in young persons, who are growing with great rapidity, and in pregnant females; examples, as Andral truly observes, strongly illustrating the necessity of frequently searching for the cause of a functional disorder far from the organ which is the seat of it.† If any circumstance impede the nutrition of the body, hunger still remains, although the stomach be distended. Thus, in a case recorded by Morton, where the thoracic duct was ruptured, the child died in a horrible state of marasmus, notwithstanding it was continually taking enormous quantities of food to appease the violent cravings of its hunger. The excessive voracity of persons afflicted with a scirrhus pylorus‡, or with disease of the mesenteric glands, is well known. In a very interesting case recorded by M. Gondret, where the whole of the stomach was thickened by scirrhus, and its capacity so reduced, that it was scarcely capable of holding eight or ten ounces of fluid, the patient suffered much from a continual and painful sensation of hunger.§ The same fact is also exemplified in individuals, whose intestinal canal is preternaturally short, as in the remarkable example described by Cabrol, where the length of intestine, between the pylorus of an enormous stomach and the anus, did not exceed three feet. And even in convalescents, sadly emaciated by severe diseases, and whose appetite is sometimes almost insatiable, it seems as if a full state of the stomach could hardly lull the general feeling of inanition. The present affection sometimes comes on merely as one of the symptoms of certain degrees of chronic gastritis. In this case, no sooner is a small quantity of food introduced into the stomach, than a complete loss of appetite succeeds the irresistible craving previously experienced, and various dyspeptic complaints follow. Many patients, affected with chronic gastritis, feel an oppressive dragging sensation in the epigastrium, which is mistaken for hunger.]

Whatever be the cause, the quantity of food devoured by persons labouring under this affection is enormous, and in some

GEN. V.
SPEC. I.
α L. Avers
organica.

Gastric
juice, how
far a cause.

Some cases
referable to
another
principle.

Quantity
of food
devoured
sometimes
enormous.

* Treatise on Indigestion, &c. p. 73. 1824.

† Andral, Anat. Pathol., t. ii. p. 192.

‡ See case by Mr. A. Burns, in Monro's Morbid Anat. of Human Gullet, &c. p. 334.

§ Magendie, Journ. de Physiol. Expér., tom. i. p. 281.

GEN. V.
SPEC. I.
α L. Avens
organica.

Some-
times not
digested.

In other
instances
digested.

Singular
example of
canine
appetite.

Sympa-
thetic
voracity.

instances almost incredible. Dr. Mortimer* relates the case of a boy only twelve years old, who, from a feeling of inanition, had so strong a craving that he would gnaw his own flesh when not supplied with food: when awake, he was constantly eating: the food given him consisted of bread, meat, beer, milk, water, butter, cheese, sugar, treacle, puddings, pies, fruits, broths, potatoes: and of these he swallowed, in six successive days, three hundred and eighty-four pounds eight ounces avoirdupois; being sixty-four pounds a day on the average. The disease continued for a year: and in this case we have a clear proof, that the feeling of hunger did not depend upon extraordinary secretion of gastric juice producing a rapid digestion; for the food was usually rejected soon after it had been swallowed, but whether without passing, or after having passed into the duodenum, it is impossible to say. And there are other cases, related by Lommius, of a similar kind.

In various instances, however, the food thus voraciously swallowed does appear to be digested, and that almost as soon as taken. Of this the case of the notorious Tarrare, as related to the National Institute by M. Percy, is a striking illustration. Before his enlistment, he was in the habit of devouring enormous quantities of the coarsest flesh, fruits, and roots; and, subsequently, he was found, after swallowing his own rations, to feed on the refuse of his comrades' messes, or offensive meat thrown on the dunghills; and to devour cats, dogs, and serpents. M. Fournier tells us, that, at seventeen years of age, when he weighed only one hundred pounds, he could devour in the space of twenty-four hours, a quarter of beef as heavy as his body; and that, on one occasion, when in the army, he devoured in a few minutes a dinner prepared for fifteen German labourers, and composed of various substantial dishes. There is a singular story, that the French commander attempted to turn this wonderful voracity and extent of stomach to a good account, by employing it as a safe deposit for a letter of secrecy, which he wished to send to a French officer, at that time in the hands of the enemy. He sent for the man, showed him a wooden case containing the letter, and having put him into good humour by treating him with thirty pounds of liver and lights, prevailed upon him to swallow it, and to depart with all speed to the enemy's quarters. Tarrare, however, was taken prisoner in the attempt; and while in prison, passed the box by stool before he could meet with the officer, but immediately swallowed it again, to prevent it falling into the enemy's hands. He was strongly suspected of cannibalism; and was often repulsed with difficulty from the ward appropriated to the dead. He at length fled from the army in consequence of a rumour that he had devoured a child sixteen months old, which had suddenly disappeared. The alvine evacuations of this man were not immoderate; but after gorging his stomach he slept and emitted torrents of perspiration, a symptom common to the disease. He fell at length into a hectic, and died of marasmus.†

Voracity is often a symptom of some other affection: it will sometimes occur in the most capricious manner during pregnancy, often in the middle of the night, or at some other unexpected

* Phil. Trans., vol. xliii. p. 366.

† Dict. des Sciences Médicales, art. CAS RARES.

period; when the patient, with a sudden sense of faintness and inanition, will perhaps devour an inordinate quantity of almost any food that can be obtained at the moment; though, in many cases, there is a fanciful longing for a particular kind, as for herrings, of which Tulpus gives an instance of a lady, who in this state devoured four hundred at a meal.* In these instances, it is probable that the urgent desire becomes a stimulus to the secretions of the stomach, and that a greater quantity of gastric juice is in consequence poured forth.

In like manner, voracity and the sense of hunger occur also as a symptom in many cases of helminthia, or worms in the stomach or duodenum. But from the emaciation which usually accompanies such persons, it is most probable, that the inanition or emptiness of the stomach is here produced, not by a rapid or elaborate digestion, but by an irritable state of the muscles of the stomach, which contract too readily, and force the food into the intestines before chymification has taken place. In the Phil. Trans. Dr. Burroughs relates the case of a patient, who, from this cause alone, was rendered capable of devouring an ordinary leg of mutton at a meal for several days together, and fed greedily at the same time on sow-thistles and other coarse vegetables.

The best means of treating idiopathic voracity must be as variable as the efficients that produce it. When we have reason to ascribe it to a morbid state of the stomach in respect to tone or secretion, purgatives, and especially those that are warm and bitter, as aloes, may be found successful. Stimulating stomachics have been found equally so; whence Galen very judiciously recommends frequent and small doses of brandy, and Riverius, of ambergris. If these do not succeed, the stomach should be kept for some days in a state of constant nausea: and, with this view, as well as with that of destroying the morbid irritation on which the voracity depends, opium will often be found a highly salutary medicine. If the disease be produced by worms, or any other remote irritation, it can only be conquered by conquering the primary affection. And if it depend on a preternatural enlargement of the pylorus, a perfect cure is beyond the reach of art; though some benefit may be derived from strong external pressure.†

The second variety, resulting from a gluttonous habit, is far more common, and very readily produced; insomuch, that there is not perhaps a corporate town in the kingdom that does not offer abundant examples of it. It is, in fact, one of the numerous evils to which idleness is perpetually giving birth; for, let a man have nothing to do, and he will be almost sure, whenever he has an opportunity, to fill up his time by filling up his stomach: and hence the lazy train of servants that vegetate from day to day, almost without locomotion, in the vestibule, hall, and other avenues of a great man's house, eat three or four times as many meals as their masters, who may possibly be employed, from morning till

GEN. V.
SPEC. I.
α L. Avens
organica.

Treat. rent.

β L. Avens
helluonum.
Gluttony.

* Lib. ii.

† In a case under M. Rostan, in 1819, ice, administered inwardly, considerably abated for a time the fury of the patient's hunger. (Med. Gazette for July, 1833.) Several pieces of tania were afterwards expelled by means of purgatives. As her hunger decreased, her appetite became depraved, so that she would devour the raw lights of slaughtered animals, and browse upon grass. — ED.

GEN. V.
SPEC. I.
β L. Avens
helluonum.

Cause
obvious.

evening, in the courts of law, the committee-rooms of parliament, or in a fatiguing maze of commercial transactions.

In tracing the cause of this voluntary disease, we have no difficulty whatever. When the stomach becomes accustomed to distention, it is never easy without it; and at length requires to be constantly full to be free from disquiet. It is also well known, that every sense grows more acute, the more it is employed: and hence the taste and longing of the glutton become more alive to what is relishing and savoury; he enjoys such indulgencies more than other men, and turns with disgust from foods that are plain and simple. On this account, the difference between the craving of a pampered appetite and that of real hunger is extreme: the former, whatever be its longing, can only satiate itself on delicious and high-seasoned dishes; the latter is content with a fare of any kind, and enjoys the plainest more than the richest.

Enlarge-
ment of the
stomach
often
hereby
produced.

By constant distention the capacity of the stomach may become enlarged, and not only hold, but require for satiety, a far more copious quantity of food than in its natural state; and hence one cause of that enormous bulk of the organ which has often been mistaken for dropsy. Bonet gives a case, in which, owing to a mistake of this kind, the patient was actually tapped, and the contents of the stomach hereby discharged, death following soon afterwards. Magendie relates an instance that occurred to himself, in which the patient, then seventy-two years of age, vomited in a few minutes, from a stomach enormously distended, as much as filled two large pails.

Means of
reclaiming
from so
mischiev-
ous a habit.

It is not often that we are asked to attempt a cure of this complaint: it generally proceeds till the tone of the stomach is exhausted by its hard labour, and the cure is effected by the introduction of dropsy, or some other disorder worse than itself, which utterly extinguishes all appetite whatever. The man, nevertheless, who would honestly undertake to reclaim himself from this mischievous habit, and to acquire a better, should proceed in his career gradually; for organs, that have long been under the influence of perpetual excitement, would lapse into atony upon the sudden adoption of a severe counter-plan. The food should gradually be plainer, less in quantity, and repeated at a greater distance of time; while the intervals should be filled up with some pleasant and active pursuit, that may wholly engross the attention; for the surest way for such a man to produce faintness, flatulency, and uneasiness in his stomach, is to think about it. The bowels will at first, perhaps, be costive; but this may easily be remedied by occasional doses of the warmer and bitter purgatives, as aloes, colocynth, and rhubarb; which will operate as usefully by their tonic as by their aperient qualities.

γ L. Avens
exhausto-
rum.

Ordinary
causes.

The voracity, produced by an exhausted state of the system, is rarely of difficult removal; for, in general, it requires good plain food, and abundance of it. It is most usually consequent upon rapid growth of the body in the period of youth, fevers, excessive discharges, especially from the bowels or blood-vessels, diabetes, long fasting, severe and uninterrupted exercise; and particularly the union of the last two, as often occurs in shipwreck, or the retreat from an enemy. It happens not unfrequently that, in such cases, the stomach occasionally overloads itself, and throws back

some part of what has been swallowed. But this is of little importance, and often proves serviceable, by more effectually inculcating moderation, than can be accomplished by medical precepts.

GEN. V.
SPEC. I.
γ L. Avers
exhausto-
rum.

SPECIES II.

LIMOSIS EXPERS.

LONG FASTING.

LOSS OR WANT OF APPETITE, WITHOUT ANY OTHER APPARENT AFFECTION OF THE STOMACH.

THE causes that lay a foundation for this species are numerous, and some of them are accompanied with a slight diversity of symptoms. The following are the chief varieties it offers to us:—

GEN. V.
SPEC. II.

- | | |
|---------------------------------------|--|
| α Defessorum. | From too great fatigue or protracted fasting. |
| Want of appetite from exhaustion. | |
| β Pathematica. | From violent passion or other absorption of the mind. |
| Want of appetite from mental emotion. | |
| γ Protracta. | From habit, or other cause, enabling the system to sustain almost total abstinence for a long and indefinite time without faintness. |
| Chronic fasting. | |

Muscular exertion and long fasting, in a vigorous constitution, prove often, as I have just observed, the most powerful incentives to hunger. But, even in the most robust frame, if these are carried beyond a certain limit, the appetite palls, and is recovered with great difficulty; while, in the feeble and delicate, a very little exercise, and a slight protraction of a meal beyond the accustomed hour, and especially where the attention is directed to it, and hangs upon the delay, is productive of the same effect. In all these cases, the stomach is best re-excited to its proper feeling by half a wine glass of sherry or madeira, with a crust of bread or piece of biscuit; or, if there be very great languor, by a few drops of laudanum in a tea-spoonful or two of aromatic spirit of ammonia; while the interval should be filled up by what is most likely to attract the attention; for one of the surest revellents, in uneasiness of the stomach, is a strong excitement of the mind.

α L. Ex-
pers de-
fessorum.
Want of
appetite
from ex-
haustion.

Best pal-
liative.

I have just said, that a strong excitement of the mind is one of the surest remedies for general uneasiness of the stomach; and every day shows us how powerfully this acts in repressing or taking away the painful sensation of hunger. No man, perhaps, ever had an appetite for food under a full influence of the depressing passions, as fear or grief: he may eat from persuasion, or a sense of duty;

β L. Ex-
pers path-
ematica.
Want of ap-
petite from
mental
emotion.

GEN. V.
SPEC. II.
Causes of
this variety.

but he eats without desire, or any craving sense of hunger. Hence those who are suddenly deprived of their senses by an overwhelming and unexpected evil, pass days and nights without food of any kind, exclaiming, perhaps, in the language of King Lear —

——— “ When the mind’s free,
The body’s delicate : the tempest in my mind
Doth from my senses take all feeling else,
Save what beats there.”

Examples
from La
Bruyère.

Even where the mind is simply but entirely abstracted, and lost in itself while pursuing an abstruse problem or proposition, or adjusting a long train of intricate accounts in a banking-house, the individual has no sensation of hunger ; and if left alone, may perhaps persevere, without knowing how the time proceeds, till warned by the darkness of the evening. And hence, La Bruyère, if I mistake not, in one of his pictures of an absent man, describes him, without any deviation from nature, as totally mistaken upon the subject of his dinner. Being summoned by his servant to the dinner-table, he answers that he will come immediately, but still continues in the same place, and indulges in the same reverie, for an hour ; when, being summoned a second time, he shows himself angry at the interruption, and still more so at the servant’s stoutly insisting upon it that he had not dined, and that the dishes were still upon the table untouched, while the master contended, on the contrary, that he had actually made his dinner, and that too in the dining-room.

General
manage-
ment.

In simple cases of this kind, medicine is not wanted ; and in the severer, it is of no use : for it is not in the healing art, under such circumstances, to “ minister to a mind diseased.” This must be left to time, the palliatives of friendship, and a change of scene.

γ L. Ex-
pers pro-
tracta.
Long or
chronic
fasting.

The modifications, however, thus far contemplated, may be regarded as mere paroxysms, or acute cases of fasting. The most singular variety of the species consists in what may be called the chronic form of affection, exhibited in those who are able to endure an unbroken abstinence from food, for a long and indefinite period of time, without faintness or inconvenience of any kind.

The medical journals and ephemerides of different nations, and the transactions of learned societies, abound with examples of this last and most extraordinary modification : many of them extending to a term of time so apparently extravagant as almost to repulse belief, notwithstanding the respectability of the authorities appealed to. It is necessary, therefore, before any such histories are noticed, that I should lay down a few general principles, too well established to allow of controversy, which by their conjoint force may lead us more readily to an admission of such as are founded upon trustworthy evidence.

Means of
accounting
for long
fasting.

1. As the stomach is capable of acquiring a habit of gluttony, or of craving too much, so it may acquire a habit of fasting, or of craving too little : or, in other words, we are as capable of triumphing over the appetite of hunger, as we are over any other appetite whatever.

The desire for food, or the sense of hunger, is very painful for the first two or three days, after which it ceases, and does not return unless stimulated by fresh food. The Chiheywans, or native

savages of Canada, according to Mr. Long, give striking proofs of the power of the stomach in both extremes—that of hard eating, and that of hard fasting—and, as nearly as may be, at the same time: for, when one of these is on the point of commencing a journey, he devours as much as he would otherwise take in a whole week; the daily allowance of animal food alone being, on such occasions, as Captain Franklin tells us, eight pounds*; and, having gorged the stomach, he starts upon his expedition, and commences a long season of severe abstinence.

2. Most of the cases of long fasting, that are credibly recorded, have been introduced by a habit of this kind. A few, indeed, have been brought on suddenly; as the result of an accidental shock, inducing an instantaneous and unconquerable antipathy to food: but by far the greater number are of the former kind; and have had their origin in severe abstraction of the mind, by intense study, rigid mortification of the natural feelings in a course of religious discipline, or some growing obstruction, or other affection, in the passage from the mouth to the stomach, or in the stomach itself, producing great uneasiness in deglutition, or digestion.

3. When a habit of this kind is once established, and a life of indolence or perfect quiet is associated with it, the quantity of food capable of supporting the animal frame may be reduced to a trifle, and may perhaps consist of water alone for weeks, or even months. We see examples of this in other animals than man. It forms a well-established fact in the history of fishes of various kinds. Even the pike, the most voracious, perhaps, of all fishes, when he has no longer an opportunity of indulging his gluttonous propensity, will both live and thrive upon water alone in a marble basin. The mere air of the atmosphere appears to afford nourishment enough for many forms of animal life. Snails and chameleons have been often known to live upon nothing else for years. Garman asserts it to be a sufficient food for the greedy spider; and tells us that, though the spider will ravenously devour flies and other prey, whenever he can seize it, he will not starve upon the spare regimen of air alone. Latreille confirms this assertion by an experiment of his own. He stuck a spider to a piece of cork, and cut him off from all food whatever for four months; at the end of which period he appeared to be as lively as at first. Mr. Baker in like manner confined a beetle under a glass for not less than three years; allowing him nothing but air for his diet: at the expiration of this period he was not only alive, but fortunate enough to effect his escape, and go in pursuit of a more substantial repast. And we are hence prepared to receive with less hesitation than we should otherwise do, the wonderful tales of frogs, toads, lizards, and other reptiles, found imbedded in trunks of trees, or blocks of marble, so deeply seated, that, though exhibiting life and activity on exposure to the atmosphere, they must have been blocked up in their respective cavities for fifty, and in some instances for a hundred years; cut off from every kind of food except the moisture by which perhaps they have been surrounded, and from all direct communication with the atmosphere itself; though, from experiments lately made by Dr. Edwards, it is absolutely

GEN. V.
SPEC. II.
7 L. Ex-
per pro-
tracta.

Brought on
mostly by
degrees:
rarely sud-
denly.

Small
quantity
of food
actually
demanded.

Water suf-
ficient food
for some
animals.

Air suf-
ficient food
for many
animals in
perfect
quietism.

Power of
long fast-
ing in cold-
blooded
animals.

* Journey to the Shores of the Polar Sea in the years 1819-22, p. 250. Lond. 4to. 1823.

GEN. II.
SPEC. II.
γ L. Ex-
pers pro-
tracta.
In fishes.

A like
power in
warm as
in cold-
blooded
animals.

necessary that there be an indirect communication of air through the pores or some other opening of the surrounding substance.* Fishes, when rendered torpid by being suddenly frozen, are well known to live in this manner through the winter in the Polar Seas, and to be re-quickened into activity by the returning warmth of the summer. "The fish," says Captain Franklin, describing the winter he passed at Fort Chipeywan, on the skirts of the Polar Sea, "froze as they were taken out of their nets, and in a short time became a solid mass of ice; and by a blow or two of the hatchet were easily split open, when the intestines might be removed in one lump. If, in this completely frozen state, they were thawed before the fire, they recovered their animation. This was particularly the case with the carp. We have seen a carp recover so far as to leap about with much vigour, after it had been frozen for thirty-six hours."†

4. It may possibly be observed, that these examples are drawn, for the most part, from cold-blooded or exsanguineous animals, and that, in such cases, there is no waste of living matter by the skin, the great vehicle of discharge in animals of a higher rank. But they are drawn from animals that, in their common customs and habits, have the same instinctive craving for food, and the same faculty of converting it into their own substance, by the process of digestion, as animals of any superior class; while a like power of enduring long periods of fasting in a state of inactivity, without any injury to the general health, is quite as conspicuous and incontrovertible in many kinds of warm-blooded animals, and especially those that sleep through the winter season.

[A combination of circumstances is generally essential to the occurrence, such as a diminution of sensibility and animal heat, a suspension of many of the functions, and especially a stoppage of the secretions and excretions. In this condition, individuals have been known to remain several weeks, and even whole months, without taking any food. Such cases are rare in the human race; but certain animals present us with annual examples of them. At the approach of winter, when they are large and fat, they fall into a torpid state, and continue so until the warmth of the spring returns. During all this time, they take no food, their respiration is surprisingly slow; the blood has rather a gentle undulation, than a circulation; and the trivial losses, which take place, are repaired entirely by the gradual absorption of fat. Hence, at the end of the torpid season, the emaciation of animals subject to its influence is very considerable. The emaciation, which an accidental or a forced abstinence of long duration brings on man, and the generality of quadrupeds, is also notorious. A hog, weighing about 160 lbs., was buried in its sty, for one hundred and sixty days, under a great mass of the chalk of Dover Cliff. When dug out, it weighed only 40 lbs. No food nor water happened to be in the sty when the portion of the cliff fell. The animal had nibbled the wood of the sty, and eaten some loose chalk, which, from the appearance of the excrement, had passed more than once through the body.‡]

5. We have reason, therefore, as well from analogy as from

Applied
analogi-
cally to
man.

* Mémoires sur l'Asphyxie, considérée dans les Batraciens. Paris, 1817.

† Journey to the Shores of the Polar Sea, in the years 1819-22. p. 248. Lond. 1823. 4to.

‡ Linnæan Trans., vol. ii.

recorded facts, to believe it possible for man himself, under certain circumstances, not indeed to pass life altogether without food, but to lose all relish for it, and to habituate himself to fastings of very considerable length, and only interrupted by slender portions of the sparest and dilutest aliment. [That hunger is a nervous sensation of the stomach seems probable, from its being influenced, like all the phenomena dependent on nervous action, by habit and by mental causes; from its being increased and excited by causes which act on the sensibility of the organ, as by spirituous drinks and spices, even when the stomach is filled; and by its being diminished by means of the contrary kind, as we know that opium will act in deadening the acute feelings of hunger, and that the Turkish and Indian fanatics called Mollahs and Faquirs are enabled by this means to support fasts of astonishing duration. The term, to which life may be prolonged without aliment, is uncertain. As Dr. Percival has observed, it varies with the incidental circumstances of the case, and the constitutional powers of the individual. It is remarkable, however, that deprivation of food is better borne in some species of disease than in robust health. In certain hysterical cases, and scirrhus affections of the cardia and œsophagus, a degree of abstinence has been endured for many months, which, in other circumstances, could hardly have been sustained for as many weeks. In catalepsy and mania, a very rigid abstinence may be borne for a considerable period.*] The cases are innumerable in which fasting has been endured ten, twelve, or fifteen days; and, where there has been access to water, twenty or thirty days†; Raulin mentions one of fifty-two days, water alone being drunk during the time‡: and Dr. Willan attended a patient who had fasted sixty-one days, with the exception of drinking from half a pint to a pint of water daily, mixed with a very small quantity of orange-juice, two oranges lasting him for a week, without any employment of the pulp.§ But there are other cases related at full length, and upon authority altogether unimpeachable, of fasting continued for twenty-five months||; three¶, ten, fifteen, and eighteen years; and, with a very spare and only occasional taste of solid food, through the entire life. In the running commentary to the volume on Nosology, I have given several of these histories at some length, and the reader may amuse himself with them at his leisure.**

GEN. V.
SPEC. II.
γ. L. Ex-
pers pro-
tracta.

Supported
by facts of
long fast-
ing.

* See Dublin Hospital Reports, vol. i. p. 159.

† Phil. Trans. vol. xiv. p. 577. Mémoires de Toulouse, l'an 1788.

‡ Observations de Médecine, p. 270.

§ Medical Communications, vol. ii.

|| Bresl. Samml. band ii. passim.

¶ Phil. Trans. 1742, 1777.

** See also Mém. de l'Acad. des Sciences, l'an 1764. Stalpart Van der Wiel, Observ. Rar. Mem. of the Lit. and Phil. Soc. of Manchester, vol. ii. p. 467., and two extraordinary cases of fasting, quoted in the Medical Gazette for July, 1833. In one of these instances, the patient is stated to have been living six years and a half without swallowing any food, though she moistened her mouth occasionally with water, tea, or whey, which she invariably spat out again. During four years, she had relief only once by stool, and three times by urine. At the age of thirty-five, the catamenia ceased altogether. In the other case, originally published by Professor Ricci, of Turin, the inability to take food continued about three years; and on the death of the patient, who was also a female, the descending colon, and commencement of the rectum, were found so obstructed by the effects of chronic inflammation, that no solid matters could pass along them. — Ed.

GEN. V.
SPEC. II.
7 L. Ex-
pers pro-
tracta.
Fluids seem
to be always
necessary.
Fasting
woman of
Tetbury.

In most cases, and probably in all, if they had been critically investigated, water, tea, or some other fluid seems to have been indispensably necessary; and such was found to be the fact in the noted instance of Ann Moore of Tetbury that has occurred within our own day. That she was an impostor, in pretending to live without any food whatever, is unquestionable; but so very spare was the quantity she had accustomed herself to, from very great difficulty and pain in deglutition, that there is reason for believing that, for many years before she submitted to the test proposed, she had swallowed very little food of any kind, except tea and spring water. And such is, in truth, the recorded opinion of the active and very intelligent committee, which undertook the trouble of watching her night and day for a whole month, in rotation. Absolutely cut off from all fluids as well as solids, this woman was on the point of expiring when she reached the tenth day, and had scarcely strength enough left to confess the fraud she had been induced to practise. Yet the committee thus close their report of her history: "On the whole, though this woman is a base impostor with respect to her pretence of *total* abstinence from all food whatever, liquid or solid; yet she can, perhaps, endure the privation of solid food longer than any other person. It is thought by those, best acquainted with her, that she existed on a mere trifle, and that from hence came the temptation to say that she did not take any thing. If, therefore, any of her friends could have conveyed a bottle of water to her, unseen by the watch, and she could have occasionally drunk out of it, little doubt is entertained, that she would have gone through the month's trial with credit. The daughter says, that her mother's principal food is tea, and there is reason to believe this to be true."*

It is remarked by Hippocrates, that most of those, who strictly abstain from food for seven days, die within that period; and that if they do not, and even begin to eat and drink again, still they perish.

Where persons from famine, superstition, severe grief, or any other cause, have persevered in a course of rigid fasting for many days, and the frame is become frightfully emaciated and weakened, the greatest care is necessary in the administration of food; which at first should be light, liquid, and small in quantity; for, not only the stomach, but the organs of assimilation lose all power by degrees; and if once requickened are very apt to be unduly excited, and induce delirium and fever. It was in this way Dr. Willan lost his patient on the fifteenth day after his return to food, though the regimen adopted was peculiarly promising and judicious.

* Full exposure of Ann Moore, the pretended fasting woman of Tetbury.

Great
judgment
necessary in
the allow-
ance of food
for reco-
very.

SPECIES III.

LIMOSIS PICA.

DEPRAVED APPETITE.

APPETITE FOR IMPROPER AND INDIGESTIBLE SUBSTANCES.

IN this species there is no want of appetite ; often, indeed, an inordinate craving ; but, instead of its directing the patient, as in the first species, to palatable and substantial food, whenever such can be obtained, it urges him in preference to the most whimsical and innutritive materials. This character forms the specific definition. The specific name here given is *PICA*. Not that the term has any particular or very obvious merit ; for its origin and primary meaning are doubtful ; but that, out of many terms, with which nosology has been encumbered to express this disease, *pica* appears to be the most general, and there is no sufficient reason for changing it.

Now, an appetite for improper and indigestible substances may be of two descriptions. It may proceed from a want of taste or discrimination, as in infants or idiots ; or from a corrupt taste, or corrupt indulgence, often founded on empirical or other dangerous advice, as the eating of chalk or acids to produce a fair skin ; and we have hence the two following varieties :

- | | |
|--------------------------|-----------------------------|
| α <i>Insulsa.</i> | From want of correct taste |
| Unwitting <i>pica.</i> | or discrimination. |
| β <i>Perversa.</i> | From a corrupt taste or in- |
| Perverse <i>pica.</i> | dulgence. |

GEN. V.
SPEC. III.
Difference
as com-
pared with
the preced-
ing species.

The depraved appetite, which is sometimes manifest in infants, can only proceed from want of proper management and direction ; for nothing is more tractable, than the organ of taste in early life. And hence, indeed, it is that the different nations of the world are brought by habit, and habit almost coeval with their birth, to prefer such kinds of food as their respective climates produce in greatest abundance, or as they obtain by an easy barter of indigenous substances. Thus, the Hindoos live entirely on fruits and grain ; the Tonguses, on berries, the refuse lichen found undigested in the stomach of the reindeer, dried fishes, and beasts of prey ; the Californians, on snakes, rats, lizards, rabbits, intermixed with the wild herbs of the soil. But, perhaps, there is no stronger proof of the force of habit in forming an acquired taste to be met with in any part of the world, than in our own country ; in our exchanging the natural and instinctive desire of a bland and sweet fluid, as milk, for the bitter beverage of tea for breakfast, and beer for dinner.

α *L. Pica*
insulsa.

Produced
partly by
habit.

On this account it is not to be wondered at, that children, without a guidance, or with an improper one, should often acquire depraved or vicious tastes, and be longing for substances that are innutritive, or even hurtful to the general health. Where this propensity has obtained a footing, it may be successfully opposed

GEN. V.
SPEC. III.

§ L. Pica
perversa.
Longing.

Sometimes
produced
by an in-
ternal mor-
bid excite-
ment.
Often by
vanity.

by discipline, and overpowered by a counter-habit. Among idiots it is incorrigible.

A longing for improper and indigestible substances, however, is often produced by other means, and occurs in persons who are possessed of a sound judgment. It is frequently to be traced as a symptom of some other affection, as pregnancy, hysteria, chlorosis, and perhaps some species of mental emotion: in all which cases, it is only to be cured by curing the primary disorder.* But it sometimes exists as a primary malady, and is then most commonly brought on by a vain desire of improving the beauty of the person, of giving a graceful slenderness to the form, or a languishing fairness to the skin, through the medium of chalk, acids, or other empirical materials. In consequence of which the Greek physicians, in whose day the practice seems to have been more common than even in our own, and this, too, among young men as well as young women, gave to this variety of the disease the name of *μαλακία*, softness or effeminacy.

Substances
devoured of
the most
disgusting
quality.

Whatever the cause, when this morbid propensity has once obtained a triumph over the natural taste, the substances for which it excites a desire are often, not only of the most indigestible, but disgusting quality. We have had examples of an inclination for devouring dirt, cinders, ordure, fire, spiders, lice, toads, serpents, leeches, bits of wood, hair, candles, and more literature, in the form of paper and printed books, than is devoured by the first scholars in Christendom.

Dirt-eaters
of the West
Indies.

Singular
case related
by Darwin.

Singular
examples of
metallic
and other
hard sub-
stances de-
voured.

Borelli gives us numerous examples of most of these; and some of them of a very extravagant kind†: and those who are desirous of gratifying themselves still further, may have full indulgence, by consulting the Ephemerides of Natural Curiosities. Mr. John Hunter describes a longing for dirt, in the form of clay or loam, to have been an endemic disease among the blacks in Jamaica.‡ But he is surpassed by Dr. Darwin, who tells us that he once saw a young lady, about ten years of age, that had filled her stomach with earth out of a flower-pot, and then vomited it up with small stones, bits of wood, and wings of insects amongst it.§

There are other persons who have had a taste for harder substances, and have glutted themselves with stones||, glass¶, and even leaden bullets.** Others, again, have feasted on pieces of money, which have sometimes formed a very expensive repast; for Borelli gives us an instance of a pantophagist who swallowed a hundred louis-d'ors at a meal.†† Yet, perhaps, after all, the most marvellous, though certainly one of the most common exhibitions of depraved taste, is an appetite for knives. There is not a country in Europe but has furnished examples of this in both

* Andral conceives, that pica may be one of the phenomena attending chronic irritation of the stomach; but, that in general the cause of it would be ineffectually looked for in the condition of that viscus alone; the disease being observed to take place principally in certain morbid states, in which the blood, and nervous system, are primarily affected. Anat. Pathol. t. ii. p. 194. — Ed.

† Cent. i. obs. 24. 52.; ii. 37.; iv. 25,

‡ Obs. on the Diseases of the Army in Jamaica.

§ Zoonom. cl. III. i. 2. 19.

|| Act. Hafn. vol. v.

¶ Camerarius, Memorab. cent. v.

** Bonet, Medic. Septentrion. lib. i. p. 510. Binninger, obs. cent. ii.

†† Cent. iv. obs. 95.

sexes : and hence the medical journals and miscellanies are numerous in their descriptions of London knife-eaters *; Prussian knife-eaters †; Bohemian knife-eaters ‡; and even, out of Europe, Brazilian knife-eaters. § The wretched patients have sometimes perished shortly after the extraordinary feat; and sometimes dragged on a miserable existence for a few years, before they fell victims to their madness or malady. In a few instances, they have recovered.

In an extraordinary instance of this kind, that not long since occurred in our own country, the knife-fancier, Cummings by name, and by craft a sailor, lived ten years after his first experiment, and occasionally persevered in the same trick during the whole of this time. The rash act is sometimes overcome, and the materials discharged piecemeal; and it might have been so in this man, but for the foolhardiness that made him insensible to the earlier warnings given him; and urged him to a repetition of the offence. || Even the American States seem of late to have furnished us with a similar example, in a young man who had long, we are told, been in the habit of swallowing various indigestible substances, as buttons, musket-bullets, and billiard-balls; and being thus initiated in the art, on June 22., 1822, swallowed not less than fourteen knives within the course of the day. Repentance came too late. He sunk gradually beneath his exploit, and died on the ensuing 25th of August. Two of the knives had been discharged from the body, one was found in the œsophagus, and the rest in the stomach. The same individual is said, on one occasion, to have swallowed a gold watch, with its chain and seal, and to have evacuated them on the ninth day, darkened in colour, but not otherwise injured. ¶

If this variety should happen to be united, as it sometimes is, with *pica avens*, or voracity, there may be no bounds to the deglutition, either in quantity or quality. ** M. Fournier, in his *Cases Rares*, has given us an instance of this kind, so extraordinary, that if it had not been most unexceptionably attested, it would not have been credible. A galley-slave, he tells us, of this description, and who was disordered in his intellects, fell at length a sacrifice to a colic, accompanied with a cough; and, on opening him, the stomach was found to occupy the left hypochondrium, the lumbar and iliac regions of the same side, and to stretch down into the pelvis. It was of a long, square form, and contained the following substances: a piece of stave *nineteen inches long*, and half an inch in diameter; a piece of a broomstick, six inches long, and half an inch in diameter; another piece of the same, eight inches long; ditto, six inches long; twenty-two other pieces of wood, of three, four, and five inches in length; a wooden spoon, five inches long; the pipe of an iron funnel, three inches long, and one in diameter; another piece of funnel, two inches and a half long; a pewter spoon entire,

GEN. V.
SPEC. III.
β L. Pica
perversa.

Cummings,
the knife-
swallower.

American
knife-swal-
lower.

Wonderful
effects
when
united
with pica
avens.

* Act. Hafn. v. 107.

† Dolæus, Encycl. Chir. p. 679.

‡ Crollius, Basilic. Chym. præf. p. 119. § Binninger, cent. v. obs. 7.

|| Marcet, Trans. of the Medical and Chir. Society, vol. xii. p. 52.

¶ New York Medical Repository, Oct. 1822.

** In the Medical Gazette for 1832-33, p. 574., the case of a woman is quoted, who used to devour raw lights, and large quantities of grass. In July, 1828, she ate so copiously of grass and buttercups for her supper, that she was seized in the night with severe pains in the abdomen; jaundice ensued; and she died in a few days. — ED.

GEN. V.
SPEC. IV.
β L. Pica
perversa.

seven inches long; another, three inches long; another, two inches and a half long; a square piece of iron, weighing nearly two ounces; various other articles, among which were nails, buckles, horns, knives, &c.; the whole weighing about twenty-four ounces avoirdupois.* So that the stomach of this unhappy being became gradually enlarged into a warehouse for all sorts of marine stores, as the term is applied in the present day.

Medical
treatment.

This morbid action is best opposed by giving a counter-action to the organ in which it exists. And hence emetics and purgatives are highly useful. Rhubarb is perhaps the best medicine for the latter purpose; and in moderate doses it should be continued daily; and in combination with it, bark, steel, and other tonics. An acid has often been suspected as the cause of the disease, and the absorbent earths, as chalk, magnesia, and Armenian bole, have been tried in large quantities; but the relief they afford is seldom more than temporary. In the mal d'estomac, or cachexia *Africana*, as it has been called, which is the disease of dirt-eating among the negroes referred to by Mr. J. Hunter, perhaps great acidity may exist, and instinctively call for the drier earths, as absorbents.

SPECIES IV.

LIMOSIS CARDIALGIA.

CARDIALGY.

IMPAIRED APPETITE, WITH A GNAWING OR BURNING PAIN IN THE STOMACH OR EPIGASTRIUM, AND A TENDENCY TO FAINT.

How distinguished
from dyspepsy.

THE symptoms laid down in this definition, are sufficiently marked to separate cardialgy from dyspepsy, in which it is merged by Dr. Cullen and various other writers; for, in the last, there is not necessarily a gnawing or burning pain; and the appetite is rather fastidious, than essentially, or at all times impaired. Cardialgia is certainly sometimes found as a symptom in dyspepsia, as it is also in a multitude of other complaints; as flatulency, scirrhus or inflammation of the stomach, worms, retrocedent gout, suppressed menstruation, and various diseases of the heart, liver, pancreas, kidneys, and intestines; in hypochondrias, and in sudden and violent emotions of the mind; but it is likewise found, in many instances, as an idiopathic affection, and should therefore be described as such.

Cardialgia admits of the three following varieties:

α Mordens.
Heart-burn.

Gnawing or burning uneasiness,
felt chiefly at the cardia, the
tendency to faint being slight.

* Dict. des Sciences Médicales, art. CAS. RARES.

| | | |
|---|--|--|
| β Syncoptica. Sinking heart-burn. | The pain or uneasiness extending to the pit of the stomach; with anxiety, nausea, coldness of the extremities, failure of strength, and great tendency to faint. | GEN. V. SPEC. IV. Limosis Cardialgia. |
| γ Sputatoria. Black-water. Water-brash. | Burning pain extending over the epigastrium; and accompanied with an eructation of watery fluid, usually insipid, sometimes acrid. | |

The first variety is perhaps the most common form of the disease. And as the gnawing or burning pain is in this case felt chiefly at the cardia, or upper orifice of the stomach, the specific name of *cardialgia* is derived from this symptom. The cardia is indeed generally supposed to be the immediate seat of affection: but this is an erroneous view. It is from the greater sensibility of the upper orifice of the stomach than any other part of it, that we are most sensible of uneasiness in that region: but irritability of the whole, or of any other part of the organ, and perhaps of the adjoining organs, as the pancreas, spleen, and liver, will often produce the same local pain; and, in some instances, it has been ascertained after death to have been occasioned by a schirrous, or some other, obstruction of the pylorus.

α L. Cardialgia mor-
dens.

In the second variety, we find the pain or uneasiness somewhat less intense, but far more general; reaching, indeed, over the whole range of the stomach and epigastrium, accompanied with nausea and anxiety; and, by sympathetically affecting the general system, attended with coldness of the extremities, failure of strength, shortness of breath, and great tendency to faint, which continues till the system reacquires warmth and perspiration.

β L. Cardialgia syn-
coptica.

From the wider circumference of the affection, Hippocrates denominated it *periodynia stomachi*. It is distinguished in popular language by the name of *sinking heart-burn*.

The third variety is distinguished by a morbid increase in the quantity of the fluids secreted; and hence the peculiar symptom of an eructation, frequently in considerable abundance, of a thin watery liquor; chiefly in the morning, after food has been abstained from for many hours, and the stomach has nothing in its cavity but its own fluids. Dr. Cullen has admirably described the disease; though he has singularly separated it to a great distance from dyspeptic affections, transferred it to another order, and erected it, apparently contrary to his own mode of reasoning, into a distinct genus. "It appears most commonly," says he, "in persons under middle age, but seldom in any persons before the age of puberty. When it has once taken place, it is ready to recur occasionally for a long time after; but it seldom appears in persons considerably advanced in life. It affects both sexes, but more frequently the female. The fits of this disease usually come on in the morning and forenoon, when the stomach is empty. The first symptom is a pain at the pit of the stomach, with a sense of constriction, as if the stomach were drawn towards the back; the pain is increased by raising the body into an erect posture, and therefore the body is bended forward. This pain is often severe; and, after continuing for some time, brings on an eructation of a thin watery fluid in

γ L. Cardialgia sputa-
toria.

Excellent
description
by Cullen.

GEN. V.
SPEC. IV.
γ L. Cardi-
algia sputa-
toria.

considerable quantity. This fluid has sometimes an acid taste, but is very often absolutely insipid. The eructation is for some time frequently repeated; and does not immediately give relief to the pain which preceded it, but does, so at length, and puts an end to the fit.* To this description it may be added, that, when the watery discharge is altogether insipid, there is merely an increased secretion of the fluids poured into the stomach, apparently in a thinner or more dilute condition; and that, when this discharge is of an acrid taste, the gastric or other juices, which exist simply and without food or other intermixture in the stomach at the time, possess an acidity in themselves; a fact, which closely connects pyrosis with cardialgia as a species, and readily reduces it to the rank of a variety under its banner. In the colloquial tongue of England, it is called *black-water*; in that of Scotland, *water-brash*, and *water-qualm*. It is the pyrosis of Sauvages, and many other writers.

General
connection
of the
varieties.

Most of these varieties have sometimes returned periodically†, especially in the spring‡; and as their general causes and mode of treatment do not essentially differ, it is more convenient to consider them jointly than under detached heads. Dr. Perceval, of Dublin, in the manuscript comment with which he has obliged me on the Nosology, ingeniously enquires, "Does it ever arise from an affection of the pancreas?" I think it likely that it does, from contemplating the structure and office of this organ; and we have various cases in which, after death, the pancreas has been found considerably enlarged.

General
causes.

The remote causes then of the present species, under whatever variety it shows itself, which is chiefly regulated by the habit or idiosyncrasy of the individual, are indigestible food or other ingesta; and habitual and copious use of very cold or very hot beverages, but especially the latter; indulgence in spirituous potations; worms, hydatids, and insects or their larvæ; drastic purges; obstructed perspiration; repelled cutaneous eruptions; and bile depraved, or excessive in its secretion. Of the indigestible foods, the most common are animal fat, oil, butter, or cheese eaten in excess; which last has produced a cardialgia that continued for three years.§ The stones or kernels of fruits have often laid a foundation for the complaint, especially where they have remained, as they have occasionally been found to do, and particularly cherry-stones, for two, or even for three years, with little or no change whatever.|| It occurs also, as already observed, not unfrequently as a sequel or symptom of some other affections.

General
effects.

All these causes have a direct tendency to produce imbecility of the stomach, especially a loss of tone, or weaker action in its muscular fibres: and a morbid condition of the fluids secreted by, or poured into it.

Acidity seems to be common to all its varieties; and this to such a degree that, as Dr. Darwin observes, the contents of the stomach,

* First Lines, vol. iv. p. 13.

† Bartholin. Hist. Anat. Cent. iii. Hist. 50. Zacchius, Consil. N. 54. 98.

‡ Eph. Nat. Cur. passim.

§ Paulini, de Nuce Moschata, sect. iii. p. 3. Eph. Nat. Cur. Dec. ii. Ann. v. app. 71.

|| Bresl. Samml. 1725. i. p. 77. Gronen. Commenc. Liter. Nov. 1733, p. 189.

when regurgitated on a marble hearth, have often been seen to produce an effervescence on it.

The acid, according to the experiments of M. Perperes, is chiefly the acetous, and he has found, that not less than two ounces and six drachms of it have been produced by eight ounces of roasted chestnuts, an aliment that ferments in the stomach for an hour and a half; and is even then digested with great difficulty. In some cases, the formation of acetous acid seems to be favoured by the nature of the gastric fluid itself, which appears to be secreted in too dilute or weakly a condition for the purposes of digestion; on which account, the food, instead of being converted into chyme, runs readily into a state of fermentation, so that some persons cannot take either honey or sugar without producing this effect; while in others, the gastric juice itself, when first secreted, may possibly contain too large a proportion of the muriatic acid, which, according to the late valuable researches of Dr. Prout, is found in the stomach during digestion.

It is not improbable, that the third variety, *cardialgia sputatoria*, may, in some instances, be produced by inactivity of the proper absorbents of the stomach. The experiments of M. Magendie show that, in a state of health, all fluids disappear from the stomach with great rapidity, in consequence of the urgency of their absorption, insomuch that a ligature on the pylorus does not in the least retard their vanishing.

In applying to this disease the resources of the art of healing, it is obvious, that our intention should be two-fold: to palliate the present distress, and to prevent a recurrence of the paroxysms. The first may be obtained by small doses of opium, and sometimes by other antispasmodics, as the ethers and ammonia; and where acidity is unquestionable, by calcareous and saponaceous earths.*

GEN. V.
SPEC. IV.
Limosis
Cardialgia.
Cardialgy.
Acidity
common
to all the
varieties.

Therapeutic means
two-fold.

First intention,
how
carried into
effect.

* *Gastrodynia* and *gastralgia* are terms frequently used almost synonymously with *cardialgia*. In one form of *gastrodynia*, described by Dr. Barlow, of Bath, the disease is represented as depending upon a redundant and unhealthy state of the mucous secretions of the stomach and bowels. Hence, instead of endeavouring, in the first instance, to palliate the pain with opium or stimulants, he begins with active purgatives of calomel and colocynth, with or without the addition of tartarised antimony. When the costiveness is obstinate and habitual, he exhibits every night, or every night and morning, if necessary, colocynth, aloetic pill, or colocynth conjoined with henbane, two parts of the former to one of the latter. While aperient medicines are continued, some of the *mistura salina cardiaca* of the Bath Hospital Pharmacopœia is given, composed as follows:—

R. Sodæ Subcarb. ℥iss.
Aq. Puræ Oviiss.
Acid. Sulph. dil. ℥j.
Confect. Aromat. ℥iij.
Spir. Ment. Pip. ℥iij.

“The foregoing quantities, thus combined, yield 324 grs. of sulphate of soda, 423 grs. of the subcarbonate remaining unaffected by the acid. Thus each ounce of the mixture contains but a few grs. of either salt; yet, insignificant as the dose may appear, it is not inert. When *gastrodynia* still goes on, after the secretions of the alimentary canal have been rectified, Dr. Barlow has found the oxide of bismuth the best auxiliary medicine, in the dose of five grains, with one of aloes, given three times a day, in conjunction with the cordial mixture. For some cases, spirit of ammonia is an useful addition; while for particular examples the camphor and cordial mixtures in equal parts; and for others, a blister to the *scrobiculus cordis*, are well spoken of.” See *Cyclopædia of Practical Medicine*, art. *Gastrodynia*. With these observations, delivered by Dr. Barlow, the practitioner may usefully compare those made by Jolly, in his account of *Gastralgie*,

GEN. V.
SPEC. IV.
Limosis
Cardialgia.
Cardialgy.

Occasional
evil of
calcareous
earths as
remedies.

Whether
an acid ever
enters into
the circu-
lating fluid.

Oleaginous
remedies.

Lime-water, or acidulous alkaline waters, or the carbonates of soda and potash, magnesia and lime, have been almost the only ones that have hitherto been employed, or at least the others have not been submitted to a sufficient trial, and under a sufficient variety of modifications, to enable us to speak of them with accuracy. It is a common belief that chalk, with an acid in the stomach, produces an astringent, and magnesia a laxative neutral. This idea is doubted by Dr. Cullen; but it seems to have a foundation, and should regulate our practice. Chalk, however, when used in large quantities, and long persevered in, has an indisputable evil, which does not equally belong to soda or magnesia; and that is, its aptitude to form balls or calculi in some part of the intestinal canal; and thus produce a very troublesome obstruction, and occasionally colic. I have known various instances of this; and, in some cases, attended with alarming symptoms before the balls were dejected; many of which I have also known to be evacuated in masses of more than an ounce weight each. There is no evidence, that an acid is found below the duodenum, and hence it is chiefly in the upper part of the alimentary canal, that these calculeous concretions are impacted and agglutinated. Dr. Parr and some others assert, that an acid formed in the stomach certainly never enters the circulating fluid. It is indeed true, that we have no sensible trace of it in the course of the circulation: but the benefit which has lately been discovered, and which we shall have occasion to advert to more fully hereafter, of introducing magnesia into the stomach, in habits possessing a tendency to form calculi in the kidneys and bladder from a superabundant secretion of lithic acid, seems to show, that an acid principle, or base, still passes from the stomach into the circulation in certain cases, though too minutely divided to be detected by chemical tests; and that the introduction of magnesia into the stomach destroys or neutralises it at the fountain-head. (See ENTEROLITHUS and LITHIA.) M. Perperes, in taking off acidity from the stomach, unites the calcareous earths with a warm bitter; and recommends, as the medicine he has found most successful, columbo root with magnesia, in doses of ten grains of the former to twelve of the latter.*

It is observed by Dr. Darwin that, as the saliva swallowed along with our food prevents its fermentation, considerable relief is sometimes derived from frequently chewing parched wheat, mastic, or a lock of wool, and swallowing the saliva thus procured.

Oleaginous preparations have also been had recourse to, and in some habits apparently with success. In such cases, it is most probable, that they act, first, by converting a part of the acid into soap; and next, by proving aperient, and thus accelerating the passage of the acid material into the intestinal canal. The complaint may also be palliated by mucilaginous substances, such as

Dict. de Méd., &c. Paris, 1833. In gastrodynia, not apparently occasioned by any thing in the stomach, "you find tinct. of opium an excellent remedy. In the continued form of the disease, prussic acid will answer better; but, I never saw it succeed, when it was given for immediate effect." (Elliotson's Lectures.) In full habits, he advises bleeding, which he has often seen relieve gastrodynia at once. Stramonium he has also known cure gastrodynia, and, as not producing costiveness, is preferable to opium. — Ed.

* Opera citata, vol. ii.

Spanish liquorice, or gum arabic. In many cases, speedy and effectual relief is obtained by the simple and pleasant remedy of eating six or eight almonds.

Yet, where we have full proof of acidity as the exciting cause, there are few medicines we can more fully depend upon than soap: probably because in its decomposition it lets loose the oleaginous principle, which may in some degree obtund the pain, and at the same time unites its alkali with the acid of the stomach; thus neutralising its acrimony, and forming a valuable aperient. "It is often," says Dr. Cullen, "a more convenient remedy than common absorbents or simple alkalies."* If the pain be very severe, we shall much improve the beneficial operation of the soap by combining it with opium. This I have already mentioned as a valuable medicine in all the varieties of the disease; but it is peculiarly so in water-brash, or the third variety. The distinguished writer I have just quoted asserts, indeed, that he has found nothing but opium that will give it real relief: but this, he afterwards adds, relieves only the present fit, and contributes nothing to the prevention of future attacks.†

It is hence necessary, in every case, to direct our view to the second intention I have pointed out: I mean, that of preventing a recurrence of the paroxysm.

Now, this can only be done effectually by restoring the stomach to its proper tone: and hence, the entire process we shall have to notice under *DYSPEPSIA*, forming the seventh species of the present genus, will here be found equally advantageous. The warmer bitters, the metallic oxyds, and especially the oxyds of zinc and bismuth, first mentioned by Odier, bid fairest for success. Of the bitters, one of the most elegant, as well as most effectual, is the extract of chamomile. The *nux vomica*, long since extolled by Linnæus, remains yet to be fairly experimented with in this country. It has the peculiar property of diminishing the sensibility, while it increases the irritability of the animal frame—a property of which I shall speak more at large when discussing the subject of *PARALYSIS*. It is said to have been given in doses of ten grains three times a day. But this I very much question, where the drug has been sound and genuine. In palsy, I have never been able to raise it above seven grains, without making the head stupid and vertiginous.‡

Among the aromatics, many of the terebinthinate balsams will be found highly useful. The balsam of Gilead, and that of Mecca, *amyris Gileadensis*, and *a. Opobalsamum*, were once highly extolled, and perhaps deservedly; but are too dear for common use. The Turks take eight or ten drops as a dose; but the quantity may be

GEN. V.
SPEC. IV.
Limosis
Cardialgia.
Cardialgy.
Operation
of soap.

Second
curative
intention.

Nux
vomica.

Terebin-
thinate
balsams.

* Mat. Med. vol. ii. p. 400.

† Amongst the means of affording prompt relief, ought to be mentioned hot fomentations to the epigastrium, and the use of the warm bath. Where tenderness on pressure is complained of, leeches are also frequently proper. If there be very fetid eructations, it is best to give an emetic; or, if this be not judged proper, the practitioner may try the effect of common acids, or two or three drachms of the solutions of the chlorurets in ordinary use. Elliotson. (See Med. Gazette, 1832-33. p. 659.) — ED.

‡ According to Professor A. T. Thomson, the *nux vomica*, in the form of powder, has been carried to the extent of fifty grains a day. *Elements of Materia Medica*, vol. i. p. 356.

GEN. V. considerably increased. In some of the pharmacopœias, cubebs, as
SPEC. IV. much cheaper, have been ordered instead of the balsams.

Limosis The diet should consist of articles least disposed to ferment; as
Cardialgia. animal food generally, shell-fishes, biscuits; and the drink be, small
Cardialgy. brandy and water, toast and water, lime-water, or most of the
mineral waters.

SPECIES V.

LIMOSIS FLATUS.

FLATULENCY.

IMPAIRED APPETITE, WITH AN ACCUMULATION OF WIND IN THE
STOMACH OR INTESTINAL CANAL; AND FREQUENT REGURGIT-
ATION.

GEN. V. It is supposed by Mr. Hunter, that air is occasionally secreted
SPEC. V. from the mouths of the secernents into certain cavities in which
Extricated it is found: but, in the present instance, there can be little or no
air, whence doubt that it is merely separated from the materials introduced
obtained. into the stomach in the form of food, and tending towards ferment-
ation. When the fluids, which are poured naturally into the stomach,
are secreted in a state of health, they concur, and perhaps equally
Its effects. so, in checking fermentation. But when, from imbecility of this
organ, or its consociate viscera, they are secreted in a dilute or
other imperfect state, they lose their corrective power, ferment-
ation rapidly commences, and the stomach is overloaded, distended,
and sometimes ready to burst with the air, for the most part carbonic
acid gas, that is hereby let loose; relief being only obtained by
frequent *eructation*, or rejection upwards; *crepitation*, or rejection
downwards, which the Greeks denominated βόρυξος, as the Latins
did *crepitus*; or its combining loosely with such fluids as may exist
in the large intestines, where it often rolls about in an ascending
or descending direction, according to the action of the diaphragm
and abdominal muscles; sometimes with a rumbling sound, where
the intestinal fluid is but small in quantity, and sometimes, where
it is considerable, with a gurgling noise like air rushing into a
bottle as the water contained in it is poured out; and hence by
the Greeks denominated *borborygmus*. We have, in consequence,
the three following varieties, under which this species presents
itself to us:

- | | |
|-------------------------|----------------------------------|
| α Borborygmus. | With frequent rumbling of the |
| Rumbling of the bowels. | bowels. |
| β Eructatio. | With frequent rejection upwards. |
| Eructation. | |
| γ Crepitus. | With frequent rejection down- |
| Dejection of wind. | wards. |

The quantity of air, separated in the manner just described, is
sometimes prodigious, and may amount to an eructation of many

hogsheads in an hour. Nor need we be surprised at this; for, by the experiments of Dr. Hales, it appears that a single apple, during fermentation, will give up above six hundred times its bulk of air: while many of the vegetable materials introduced into the stomach possess far more ventosity than apples.

Flatulency, under one or other of the forms now enumerated, is often found as a symptom of other diseases; especially in dyspepsy, cholera, colic, hysteria, and hypochondriasis. But, there is no doubt, that it occasionally exists by itself, and is strictly idiopathic, occurring after the deglutition, and even enjoyment, of a full meal, without any other symptom of indigestion, and ceasing as soon as the process of digestion is completed.

[Flatulency produces various feelings of distress, according to the part of the alimentary canal in which the wind is generated, or pent up. When it is copiously generated in the stomach, and is not expelled by eructation, it gives rise to all the distressing consequences always resulting from great distention of that organ. In some instances, severe pain is excited by the simple extension of its fibres, or their spasmodic contractions. In others, especially in hysterical habits, the adjoining organs are considerably affected by the pressure of the distended stomach; whence great anxiety and oppression are felt in the chest from the impediment to the free motion of the lungs and heart; the respiration becomes laborious and difficult, with a sense of suffocation, and the action of the heart intermits, or violent palpitations occur.

When the bowels are inflated, a sense of uneasiness is experienced, with a rumbling or gurgling noise. Sometimes colic is an attendant on the complaint, and sometimes the whole abdomen is enlarged by the general distention of the intestines with air, accompanied with constipation. When this distention has been of some duration, a degree of paralysis of the muscular fibres of the bowels is produced; their power of expelling the wind is lost; the skin of the belly becomes as tight as the parchment of a drum; and the patient falls into a state of great emaciation. This disease is called *tympanites*.]

A very common cause of flatulence is drinking a large quantity of some cold fluid while the system is labouring under great heat. Another is eating raw vegetables, cucumbers, radishes, salads, &c. or cabbages and other vegetables not duly boiled.

Infants are peculiarly subject to this affection, from the natural delicacy of the stomach, and particularly when brought up without their natural sustenance, and upon food which requires more labour of the stomach to digest. In many cases it must necessarily be combined with acidity; for this, as already observed, is a general effect of impaired action in the chylific viscera: and when both these causes concur, the infant will also be tormented with severe gripings, and great irregularity in the bowels; a distressing and watery diarrhoea; or an obstinate costiveness; and sometimes with both in succession. Essential oils, absorbent powders, and aperients may palliate the symptoms, but the best cure will always be found in a healthy breast of milk.

Hypochondriacs, and others of weak digestive power, are very apt to acquire a habit of eructing; and are perpetually striving to throw up wind from the stomach in an expectation of relieving themselves

GEN. V.
SPEC. V.
Limosis
Flatus.
Flatulency.
Quantity of
air set free
sometimes
enormous.
Symptom-
atic.
Idiopathic.

General
effects of
flatulence.

From the
effect of
cold drinks
on a heated
frame.
Raw vege-
tables.
Flatulency
in infants.

How re-
medied.

GEN. V.
SPEC. V.
Limosis
Flatus.

from the elastic vapour with which they seem to be bursting. It was observed by Dr. Darwin, that when people voluntarily eject carbonic acid gas from their stomach, the fermentation of the aliment is accelerated; just in the same manner as stopping the vessels which contain new wines retards their fermentation, and opening them again quickens it. [This idea, applied to the case of flatulence, may be ingenious; but, probably, it will never persuade a single patient to repress his endeavours to relieve himself by eructations. The reality also of the ill effects of the practice is doubtful.] If cardialgy attend, the air is sometimes eructed with a sense of burning so violent, as to make the patient imagine he is actually, like a volcano, belching forth flames and fire from his entrails.

Sense of
belching
flames with
the wind.
Voluntary
distention
employed
as a trick.

There are some cases on record, in which persons appear to have a power of distending the stomach and abdomen to an enormous size at pleasure; and advantage has been taken of this by one or two female impostors, who, for particular purposes, have hereby pretended to be pregnant, and have succeeded by such an imposition. But a distention of this kind does not belong to the disease before us.

Plan of
cure.

The cure in this species, as in the last, depends upon giving tone to the muscular fibres of the stomach and intestinal canal; and hence the plan laid down already, and the course to be described under dyspepsia, will have the greatest chance of success.

Emetics,
how far
useful.

Emetics have occasionally been recommended, with a view of giving a change to the action of the stomach; but they are of doubtful efficacy. They have been of great service, however, incidentally, by discharging some lurking body which has itself been a chief cause of the disease. In this manner, worms have at times been thrown up; and at times also morsels of indigested fruit or other materials, as plum-stones, or fragments of a pear or apple.*

Carmin-
atives.

The disease may be palliated by an innumerable host of carminative plants, which vary in their several effects according to the variety of the idiosyncrasy, or the actual state of the stomach.

Verticillate
carmin-
atives.

The verticillate order affords an abundant stock, from which we may select at pleasure; as marjoram, thyme, rosemary, lavender, spearmint, peppermint, and pennyroyal; the aroma of all which resides chiefly in the leaves or calices.

Coniferous
carmin-
atives.

The coniferous order offers, perhaps, nearly as many, including the terebinthinate and juniper tribes; but of less activity than the preceding, except in the instance of the essential oil of juniper, the pleasantest of all the turpentine family. The medicinal virtue of both these orders is that of camphor, which they all contain very largely, especially the peppermint, as shown by the experiments of Gaubius.† The pungency of this plant, however, is so acrid, as to exhaust the sensibility of the nerves of the tongue and palate for a moment, and hence to give a feeling of coldness in succession to that of heat. Its best form is what is called its essence, which, as conjectured by Dr. Cullen, appears to be nothing more than its rectified essential oil dissolved in spirit of wine. On account of the acritude of this plant, it is less valuable, as well as less palatable, than spearmint; which last acts better, and is more pleasant to the taste when fresh in infusion than when distilled.

* Riedlin, Lin. Med. ann. iv. v.

† Adversar. passim.

The umbellate order affords also a rich variety of carminatives, whose virtue, with a few exceptions, resides almost entirely in their seeds. The aroma of several of these is very pleasant, as the coriander, anise, and dill; while, in a few, as in the fennel, it approaches the nauseous smell and taste of the fetid gums. This, however, is an advantage in flatulencies occurring in hysteric or other nervous habits.

GEN. V.
SPEC. V.
Limosis
Flatus.
Umbellate
carmin-
atives.

To these may be added many of the aromata imported from hot climates in very different forms; as barks, roots, berries, pods, and seeds, particularly ginger, cloves, cardamoms, cinnamon, pimento, pepper, and capsicum. Like those already noticed, they all owe their virtue to an essential oil, in whatever part of the plant such virtue may reside: but several of them have likewise some other property, which may render them more or less eligible in different cases. Generally speaking, the stimulants we are now contemplating are more strictly entitled to the name of cordials than the umbellate or verticillate plants; for, by exciting the nervous energy in a greater degree, they increase the action of the heart, and quicken the pulse. And hence, when the circulation is weak and languid, they have an advantage over the preceding; but when the pulse is already too frequent, they should be abstained from.

Spicy
exotics.

To this general remark, however, there may be one or two exceptions. Newmann and Gaubius, reasoning from the general use of pepper among the Hindus and Javanese without any particular marks of excitement, have contended that it produces less effect on the sanguiferous system than many other carminatives; but this may be resolved into habit. Dr. Lewis, from some less obvious train of argument, came to a like conclusion in respect to ginger; which to many is as heating as any of the spices whatever. But it seems generally conceded, that nutmeg is entitled to the character of a sedative and even of an hypnotic; and hence, where flatulency is accompanied with great irritability, it becomes peculiarly valuable. Bontius speaks of this influence as a matter of frequent occurrence in the East Indies, and one which had often fallen under his own observation; and in the German Ephemerides* we have an account of some extraordinary effects on the nervous system, occasioned by swallowing a large quantity of this spice. To which I may add the following confirmatory evidence of Dr. Cullen, derived from his own practice. "A person by mistake," says he, "took two drachms or a little more, of powdered nutmeg. He felt it warm in his stomach, without any uneasiness; but in about an hour after he had taken it, he was seized with a drowsiness, which gradually increased to a complete stupor and insensibility; and not long after he was found fallen from his chair, lying on the floor of his chamber, in the state mentioned. Being laid a-bed, he fell asleep; but waking a little from time to time, he was quite delirious; and he thus continued alternately sleeping and delirious for several hours. By degrees, however, both these symptoms diminished; so that, in about six hours from the time of taking the nutmeg, he was pretty well recovered from both: although he still complained of head-ache and some drowsiness, he slept naturally

Sedative
and hypno-
tic quality
of nutmeg.

* Dec. II. Ann. II. Obs. 120.

GEN. V.
SPEC. V.
Limosis
Flatus.

Oxyde and
nitrate of
bismuth.

and quietly through the following night, and next day was quite in his ordinary health.”*

Many of the foregoing remedies have often been combined with the oxyde or nitrate of bismuth; and as they have commonly been more successful with such adjuncts than when given alone, these preparations of bismuth itself may be regarded as an useful carminative. They are especially serviceable when the flatulency is chronic, and accompanied with distressing pain.

Before quitting this subject, I will just notice two other remedies for flatulency, because they not only afford benefit at the time, but, by their tonic virtue, have some tendency to correct the disorder radically.

Aspalathus
canariensis,
or rose-
wood.

The first of these is the tincture of *aspalathus canariensis*, the rosewood, or Rhodium lignum, of the old writers. This shrub readily yields its fragrant essential oil to rectified spirit; and the tincture is commonly made by macerating four ounces of the wood in a pint of the spirit. It proves a warm, balsamic, and pleasant cordial in doses of from twenty or thirty drops to a drachm.

Etherial
oil.

The second remedy I have alluded to is the etherial oil, as it is now called, or the oleum vini, as it was called formerly, which is found in the residuum of sulphuric ether, and is easily made to float on the surface by the addition of water. It has a strong, penetrant, and aromatic odour, and readily dissolves in alkohol and ether. It is powerfully sedative as well as cordial, and is sufficiently known to be the basis of Hoffman's celebrated anodyne liquor. In the Pharmacopœia of the London College, this anodyne is imitated in the compound spirit of ether, the only preparation in which the etherial oil is an ingredient. For the purpose I am now speaking of, however, it should be dissolved, and in double the quantity contained in the preceding preparation, in the aromatic spirit of ether. [Flatulency admits of being relieved by the generality of stimulant and antispasmodic medicines, such as assafoetida, the strong smelling gums, ammonia, opium, ether, &c. Together with internal remedies, Dr. Darwin applied fomentations to the epigastric region, and Dr. Whytt, stimulating liniments.]

Stimulants.

SPECIES VI.

LIMOSIS EMESIS.

SICKNESS OF THE STOMACH.

REJECTION OF THE CONTENTS OF THE STOMACH, OR TENDENCY TO REJECT.

GEN. V.
SPEC. VI.

A DISPOSITION to regurgitate, or even the act of regurgitation itself is not necessarily a morbid affection; and to render it such, it must be combined with the symptoms forming the generic character,

* Hence, Dr. Cullen cautions us against giving this aromatic in apoplectic or paralytic cases. The use of the nutmeg, as a medicinal agent, dates from the time of Avicenna. “The volatile oil is sometimes ordered in the form of an oleo-saccharum in flatulent states of the stomach and intestines,” &c. See *Dr. A. T. Thomson's Elements of Materia Medica*, &c. vol. i. p. 226.

which, though not specifically repeated, are always supposed to constitute a primary part of the description; and which, in the present genus, is an "impaired, excessive, or depraved appetite." Thus a regurgitation of food is natural to all grazing quadrupeds possessing complicated or numerous stomachs, as the sheep and ox; and it constitutes what is called rumination, or chewing the cud; the inverted action taking place at the will of the animal, and the food being thrown back from the first stomach, or paunch, into the mouth, for the purpose of further mastication. There are instances of rumination, or a simple voluntary regurgitation of the food into the mouth, among mankind. The German writers upon this subject are numerous, and their collections of cases abundant. But one of the best examples on record is that given by Dr. Slare.* The subject was an adult man, in good general health; the rumination regularly took place about a quarter of an hour after eating, at which time the food felt heavy in the lower end of the œsophagus. If he did not ruminate at the proper time, he soon became languid and sick.

GEN. V.
SPEC. VI.
Limosis
Emesis.

Rejection
alone not
necessarily
a disease.

Instances
of rumi-
nation in
man.

It is a question that has raised much controversy, which are the parts chiefly concerned in exciting the stomach to vomit? Haller, and the physiologists of his time, were wont to refer us to the stomach itself. It was the opinion of Mr. John Hunter, that this action is performed alone by the muscles surrounding the stomach, and that the stomach itself is at the time as passive as the lungs in expiration.†

By what
powers
rejection is
excited.

For the determination of this point, M. Magendie lately instituted a series of highly curious experiments, of which a brief account has been given in the Physiological Proem. From these it would appear, that, in nausea, the action is confined to the organ of the stomach alone, or perhaps in conjunction with the œsophagus; that retching is produced by the contraction of the abdominal muscles, and rejection by the contraction of the diaphragm alone, or in conjunction with that of the abdominal muscles; and, consequently, that an emetic does not cause vomiting by irritating the fibres or nerves of the stomach, but, as suspected by Mr. J. Hunter, by means of absorption and irritation of the nerves of the muscles that surround the stomach; or rather by the stimulus produced on the brain, instead of on the stomach, and especially transmitted to these muscles.‡

Experi-
ments of
Hunter and
Magendie.

* Phil. Trans., vol. xvii. 1690-3.

† It has been already explained in the Physiological Proem, that, in vomiting, the pharynx is elevated and the glottis shut; and that, as soon as the contents of the stomach have been expelled, the pharynx again falls, the glottis opens, and a full inspiration takes place. See Professor A. T. Thomson's *Elem. of Materia Medica*, vol. ii. p. 187. This work contains many judicious reflections on the views given of this subject by Magendie, Sir C. Bell, Dr. Marshal Hall, and others. The closure of the larynx, and the retention of air in the lungs, according to Dr. Marshal Hall and Dr. A. T. Thomson, prevent the ascent of the diaphragm into the chest; and the pharynx being drawn up, as in the act of deglutition, opens the cardiac orifice of the stomach, and forms with this viscus one continuous cavity. This fact explains the remark of Magendie, that, "during the state of nausea, which preceded vomiting in some of his experiments, air was drawn into the stomach." Dr. Thomson's explanation differs from Dr. Hall's, chiefly in representing the diaphragm as fixed, and not floating and loose. — Ed.

‡ If emetics always acted by their local stimulating influence on the coats of

GEN. V.
SPEC. VI.
Limosis
Emesis.

Magendie's
conclusions
questioned
by Portal.

These experiments, however, have since been called in question by M. Portal, as not conducted with sufficient strictness, and leading to conclusions too generally and too hastily drawn. He maintains that vomiting commences by a particular action of the stomach, and is then aided and continued by the action of the abdominal muscles, and of the diaphragm: but that, in many cases, this auxiliary assistance is by no means necessary; since, according to his experiments, vomiting may be produced in the stomach when the abdominal parietes have been removed.* And, consistently herewith, Dr. Parr informs us, that the diaphragm "has been wounded, torn, and its apertures enlarged, so as, either by laceration or dilatation, to admit of the passage of the stomach, or a part of the colon, into the thorax without any uncommon symptoms."† [In the example of incessant vomiting, recorded by Gondret‡, where the coats of the stomach were found after death indistinguishably blended together, and converted into a homogeneous scirrhus mass, it may be doubted, whether the organ itself had any share in the rejection of its contents. In the enormous dilatations of the stomach which sometimes fill the greater part of the abdomen, without any disease or obstruction of the pylorus, some cases and dissections of which are well described by M. Andral, it is easily conceivable, how a slight pressure produced on the stomach by the abdominal muscles, might occasion the frequent vomiting by the partial expulsion of its contents, notwithstanding the paralytic state of its own muscular fibres; the cause to which this author, with great plausibility, ascribed its prodigious dilatation.§ This, however, was a state of disease; and by no means amounts to a refutation of the doctrine, that, under ordinary circumstances, the stomach itself, as well as the muscles of respiration, assists in the expulsion of its contents. The same observation applies to the curious malformation recorded by Drs. Graves and Stokes||, in which, though the stomach was lodged in the thorax completely above the diaphragm, continual vomiting attended the patient's illness. This case, with other facts bearing on the different views entertained of the question, seems to justify the conclusion which the editor arrived at in the Physiological Proem.]

Sympathy
between the
stomach
and other
parts.

Doubtless, a close connection and sympathy exist between the stomach and its surrounding muscles; and hence, let the irritation commence in whichever organ it may, it will be instantly propagated to the other. We have the same proofs of sympathy in the stomach, the ileum, the œsophagus, and the fauces. And we can evidently trace the retrogressive action commencing in different diseases and under different circumstances, sometimes in one of

the stomach, it might be expected that the time, which elapses between the taking of an emetic substance into the stomach and its operation, would be much shorter than it is; and Professor A. T. Thomson is of opinion, "that, in every instance, unless from a mechanical irritant, the emetic substance must be taken into the circulation, before vomiting is induced. We know, that when tartar emetic is introduced directly into the circulation, — into a vein, for example — it produces vomiting sooner than if it had been swallowed." *Op. et vol. cit. p. 188.*

* *Mém. de l'Institut Royal de France, Mai 19. 1817. Mémoires sur la Nature et le Traitement de plusieurs Maladies, tom. iv. Paris, 1819. 8vo.*

† *Dict. Append. p. 101.*

‡ *Magendie, Journ. de Physiol. Expér., tom. i. p. 280.*

§ *Op. cit., tom. ii. p. 248.*

|| *Dublin Hospital Reports, vol. v. 8vo. 1830.*

these organs, and sometimes in the other. And we can sometimes, moreover, see this action limited to a particular part; sometimes running through a certain length of the chain, and sometimes through the whole. The idea of swallowing a nauseous dose of medicine, or an irritation of the fauces by a hair, will often excite a retrograde action in the œsophagus alone: a discharge of wind in cardialgia, or of a small portion of acid, or oil, or any other substance floating on the surface of whatever may be contained in the stomach, seems to excite the fibres of the cardia alone, and they are expelled by its simple and unassisted effort, producing a single act of eructation or belching. The sulphates of zinc and copper, and perhaps all the metallic emetics, act unquestionably upon the fibres of the stomach generally and primarily; and probably all the ipecacuans, whether of the psychotria, the callicocca, or the viola genus, are first absorbed, as asserted by M. Magendie, and then produce vomiting by irritating the fibres of the surrounding muscles. Sea-sickness, and various affections of the head, apparently act in the same manner; and the contractile and inverted action only takes place after a paroxysm of intolerable sinking and languor. In ileus, the retrogressive movement, commencing in the bowel which gives rise to the name of this disease, runs with great violence through the whole chain of the alimentary canal; inasmuch that medicines introduced into the rectum are rejected by the mouth. In few words, then, "vomiting," to adopt the language of Sir C. Bell, "is an action of the respiratory muscles, excited by irritation of the stomach*;" or, as we should add, of those muscles themselves.

GEN. V.
SPEC. VI.
Limosis
Emesis.

Different
organs
excited by
different
emetics.

Sickness of the stomach occurs under different forms: the three following are the chief varieties:—

- | | |
|----------------|------------------------------------|
| α Nausea. | Tendency to reject, but without |
| Loathing. | regurgitation. |
| β Vomituritio. | Ineffectual effort to vomit. |
| Retching | |
| γ Vomitus. | Act of vomiting, or rejecting from |
| Vomiting. | the stomach. |

Sauvages and Linnæus regard the first and third of these varieties as distinct genera of disease, and even arrange them as such. This appears highly incorrect: for, if minutely examined, they will be found, in every case, to be little more than different degrees or

* Experiments on the structure and functions of the nerves. Phil. Trans., 1822, p. 406. Sir Charles Bell qualifies this theory by observing, "that when the stomach is excited to vomiting, there is consent of the abdominal muscles, by which they are brought into violent spasmodic action; not alternating in their action, as in the motion of respiration, but acting synchronously, so as greatly to assist in compressing the stomach;" but "at the same time, the action of these muscles, however forcible their contraction, cannot alone cause vomiting; nor has this action any tendency to produce such an effect on other occasions, in which the utmost contraction of the diaphragm and abdominal muscles is required for the compression of the viscera." Vomiting is not, therefore, simply an action of the respiratory muscles. Dr. Marshal Hall's explanation of the mechanism of vomiting is this:—"the contents of the thorax and abdomen are subjected to the sudden and almost spasmodic contractions of all the muscles of expiration, the larynx being closed, so that no air can escape from the chest, and the two cavities being made one by the floating or inert condition of the diaphragm."—ED.

GEN. V.
SPEC. VI.
Limosis
Emesis.

These
varieties
not differ-
ent species.

Different
effects pro-
duced on
the system
by nausea
and vomit-
ing.

Nausea,
where
useful.

modifications of the same affection, produced by a greater or less inversion of the peristaltic motion of the stomach and œsophagus, whatever be the cause of such inversion, and allayed or overcome by the very same means. Where the stimulus, and consequently the degree of inversion, is slight, the effect is confined to nausea; if beyond this, the nausea becomes retching; and then the retching becomes vomiting. They may, indeed, exist separately; for the cause may be of a kind or strength sufficient to throw the stomach at once into a state of violent inversion, and, consequently, to produce vomiting without the common intermediate changes; as in the case of various metalline emetics, sympathetic irritation from pregnancy, or the swallowing putrid vapour. While, on the contrary, minute doses of squills, or ipecacuan, or any other cause that produces but a slight degree of action, will excite nothing more than nausea, or the first stage alone of the inverted action upon which the general affection depends.

It is nevertheless curious, and of great importance, to observe the different and opposite effects, produced on the animal frame by these two stages of one and the same disease. Nausea lowers the pulse, contracts the small vessels, occasions cold perspiration, severe rigors, and trembling, and diminishes, as long as it lasts, the action and even the general powers of life. The act of vomiting, on the contrary, rouses rather than depresses; puts to flight all the preceding symptoms, and restores the system to itself.* There are few persons so debilitated as not to bear vomiting, but many who would sink under nausea. It is obvious, therefore, that these two different states of the stomach may be employed as powerful instruments in attacking a variety of general, and even of remote local diseases; this organ being justly considered as the common centre of sympathy, and producing opposite results, according as it is excited to different modes or degrees of action. As nausea diminishes the action of the system generally, and particularly that of the small vessels, it has been often had recourse to with success in inflammation of various organs, particularly of the eyes and lungs; as it has also on the approach of the first fit of intermitting fevers, or the accession of those of a continued type, which threaten a considerable degree of violence. Full vomiting,

* In vomiting, or the forcible ejection of the contents of the stomach, the influence of the emetic is carried beyond this organ; for, the secretion of the liver being forced into the duodenum, and passing from that into the stomach, in the act of straining, is also ejected. Besides, by the same act, all the abdominal viscera are compressed; and, by a repetition of this cause, the blood is propelled more forcibly through these viscera, and the secretion of the fluids thereby increased and altered. In particular, the blood is propelled through the vena portarum; and, consequently, the secretion of bile is both augmented in quantity, and altered in quality: the gall bladder and biliary ducts are emptied; the pancreas and spleen are also affected; and the action of the kidneys promoted. The pulmonary system likewise feels the influence on the whole constitution; and the circulation through the lungs is accelerated. But, these organs are partly affected by their sympathy with the stomach, and not wholly by the mechanical action of vomiting. Vomiting excites the secreting and exhaling vessels of the lungs, and hence emetics hold a place among expectorants. They produce a change in the secreted fluids of the stomach itself, not only bringing about the evacuation of any superabundant acid, but so altering the action of the secreting vessels, that for a time all trace of acid disappears. See Dr. A. T. Thomson's *Elem. of Materia Med.*, vol. ii. p. 194.; a work abounding in valuable matter.—ED.

by augmenting the general action, and consequently giving great additional energy to the absorbent system, has also been very advantageously employed to remove inflammation, though in a different manner; and particularly inflammation of the suppurative kind. Orchitis and purulent ophthalmia have often yielded to it as a charm; and we have various instances, in which the fluid of extensive abscesses has been hereby carried off in a few hours. From the pressive violence of the action, it has also been highly beneficial in many cases of obstruction, or chronic torpidity: and hence its occasional utility in amaurosis and caligo; and still more so in congestions of the liver and other abdominal viscera.*

GEN. V.
SPEC. VI.
Limosis
Emesis.
Vomiting
where
useful.

As different emetics, however, produce not only a different action on the stomach, but also on the system at large or different parts of it, they are by no means to be used indiscriminately, but in reference to the particular object we have in view. This difference of effect depends upon the peculiarity of their *emetine*, as the French writers denominate it, or emetic principle, of which we require further instruction than has been obtained at present; though the experiments of MM. Magendie and Pelletier have given us some information concerning this principle, as it exists in the brown ipecacuan (*psychotria emetica*), the grey (*callicocca ipecacuanha*), and the white (*viola emetica*). [When given in doses of from a grain to three grains it produces full vomiting; and, as none of the other principles of ipecacuanha root produce this effect, there is no doubt, that its emetic power is owing to the emetine, a principle contained in the roots of some other plants, besides those of ipecacuanha.†]

Different
effects of
vegetable
emetics
derived
from the
difference
of their
emetine.

The ipecacuans, however, though possessing some diversities of power, concur in operating very generally upon the skin, at the same time that they excite the stomach; increasing, in a slight degree, the discharge of mucus from the lungs, and adding a little to the peristaltic motion of the bowels. The antimonial emetics, in a full dose, act more violently upon the stomach, bowels, and skin, but less upon the mucous secretions. While in small doses, the nausea they produce is accompanied with the most deadly languor, and with an atony, that, in numerous cases, has been succeeded with more mischief than any degree of benefit that could have been proposed by their use. "Many in this manner," says Dr. Perceval, of Dublin, in his manuscript remarks on the volume of Nosology, "have sunk under the nauseating doses of emetic tartar, employed, upon the hypothesis of Dr. Cullen, in low fevers. The heart of a frog is so torpidified by this antimonial, as not to be excited by galvanism, which is not the case with opium. The fraction of a grain of tartar emetic, in a gouty habit, subject to

Ipecacuans.

Compared
with anti-
monial
emetics.

* During the action of vomiting, as Professor A. T. Thomson observes, the blood is propelled, not only more quickly through the arteries, but also through the veins. Thus, it is more generally and equally diffused; and, of course, local determinations and congestions are removed. He doubts, whether emetics really quicken the action of the absorbents, and is inclined to believe that the impulse, communicated by them to the capillaries, has the effect of lessening deposition, and, as the process of absorption goes on at its ordinary rate, collections of fluids, tumours, and thickenings of membranes disappear after the operation of emetics. *Op. cit.*, vol. ii. p. 195. This latter theory is different from what is commonly entertained. — Ed.

† See A. T. Thomson's Elem. of Mat. Med., vol. ii. p. 209.

GEN. V.
SPEC. VI.

Limosis
Emissis.

Squill and
seneka.

Asarum, its
peculiar
use.

Hot water.

Power in-
creased by
adding
simple
stimulants,
as horse-
radish, &c.

Air.

Metalline
emetics.

Alkaline
salts.

Nitrate of
potash.

melæna and palpitation, produced an alarming deliquium. In the same subject, a similar effect attended the use of other antimonials.*"

The squill and seneka† root act very generally; proving not only emetics, but cathartics, and expectorants. The asarum, which was once extensively employed for vomiting both in its root and leaves, at the same time that it inverts the stomach, acts powerfully on the olfactory nerves, and becomes a pungent emetic. It is hence by far the best emetic we can select in affections of the eyes, and several species of cephalæa. Hot water operates only as a simple stimulant to the stomach; and hence, unless there be other irritants in its cavity, rarely takes effect till the stomach becomes distended, and the nervous fibres of the pylorus are inordinately excited by the quantity swallowed. If, however, we infuse in the hot water a certain portion of horseradish, mustard-seed, the root of mezereon, or a handful of chamomile flowers, we increase its stimulant power, and a much smaller quantity is sufficient. And, it is probable, that all these substances act, in like manner, as simple stimulants alone; for, in small doses, they tend rather to take off, than to excite, sickness. There is little doubt that air acts in the same way; for some persons, as M. Goss, of Geneva, by swallowing and distending their stomach with air, are at any time able to discharge its contents. The sulphates of zinc and copper, and the more powerful preparations of antimony, are probably simple stimulants also, but of a high degree of activity. They act on the stomach almost as soon as they are introduced; and hence are peculiarly eligible for a rapid expulsion of poisons that have been taken inadvertently. If taken, however, in too large a dose, they become quite as mischievous as any poison they are intended to remove; for they prove violently corrosive to the coats of the stomach, and excite hæmatemesis, or vomiting of blood. There are some of the alkaline salts that act in the same manner when taken in excess, and throw not only the stomach, but other parts of the system, into violent spasmodic motions. Two ounces of nitre were taken, by mistake, for one ounce of Epsom salts. An almost incessant vomiting for two days was the result, accompanied with a copious discharge of grumous blood from the excoriated mucous membrane of the stomach; notwithstanding that very large quantities of warm water were repeatedly drunk, and alternated with equal quantities of gruel and mucilage of gum-arabic, to defend the surface of the stomach by an artificial mucilage. The patient recovered, but was long afterwards subject to chronic spasms, resembling chorea.‡

The ipecacuans, and, indeed, most of the preceding emetics, excite vomiting as effectually by being introduced into the blood-vessels, and consequently exciting the abdominal muscles through

* Dr. A. T. Thomson considers ipecacuanha preferable in every instance, in which the powers of the stomach are required to be maintained, and yet vomiting is indicated; and, in cases of chronic diarrhœa, there can be but one opinion as to the superiority of ipecacuanha over tartar emetic. When deleterious effects arise from over-doses of ipecacuanha, or emetina, the best remedy is infusion of galls, which, by forming an insoluble precipitate with the emetina, renders it inert. Op. cit. vol. ii. p. 214, 215.—ED.

† Seneka, or rather senega, root, is highly commended as one of the most certain emmenagogues, by Dr. Chapman, Professor of Materia Medica in the University of Pennsylvania. — ED.

‡ Buller, in Edin. Med. and Surg. Journ., No. 53. p. 34.

the medium of the brain, as by being conveyed into the stomach. But there are some articles that will produce this effect on being applied to the surface of the epigastric region, or the hypochondria alone; as the oil of croton, tobacco, and, what we should far less expect to possess such activity, the leaves of groundsel beat up into a cataplasm. Mr. Stedman, of Kincross, who, I believe, first published an account of this power in both plants, availed himself of it as a remedy for agues, and parabysmic tumours of the liver.*

As the stomach is the common centre of sympathy, it is not to be wondered at that nausea, or sickness, should be a symptom common to a variety of diseases, seated in organs more or less remote from itself. And hence we find it occurring in colic, cholera, stone, the accessions of fevers, repelled gout, and various affections of the head.

The last is, indeed, a very frequent, perhaps the most frequent, of all the sympathetic causes whatever; for nothing can disturb the regularity of the sensorial function without disturbing the stomach; and hence sickness is sure to follow oppression of the brain, whether produced internally by hanging, drowning, or apoplexy: or externally, by a fracture of the cranium accompanied with depression. A severe jar of the brain, as in the case of concussion, even without extravasation, is certain of exciting the same effect. Nay, any slighter motion to which the head has not been accustomed, as that of moving it rapidly from shoulder to shoulder in a half rotatory direction, accomplishes the same purpose. And hence we see the reason of the vomiting induced by running, or riding a horse round, a small circle: by the act of swinging, or riding backward in a coach; and all the languor and deep regurgitation of sea-sickness. The living frame, however, has a most wonderful instinctive power of accommodating itself to circumstances: and hence, by habit, we are enabled to undergo the new motion without any inconvenience to the sensorium, and consequently without any sickness of the stomach. And this power of accommodation is so considerable, that we have numerous instances of extensive depressions, and even of bullets and other foreign substances lodged in the brain, which, though at first productive not only of incessant sickness, but of the most dangerous symptoms of compression, have by habit been borne without any evil to this organ; and hence, also, without any disquiet to the stomach.

In all these cases, however, the brain must still retain a certain degree of excitability: for, if this be entirely or very nearly lost, neither the muscles surrounding the stomach, nor even the stomach itself, possess energy enough to produce an inversion of this organ. Hence, in an extreme state of apoplexy, or asphyxy, there is no vomiting whatever, nor is it possible to excite it in the profuse and sudden exhaustion of the nervous power which follows upon swallowing large doses of the *atropa belladonna*, and various other narcotics; in combating the effects of which, fourteen grains of tartarised antimony have been administered to no purpose. "Now, if, in such a case," says Dr. Paris, "a copious draught of some vegetable acid be given, the emetic will be more likely to succeed." And, agreeably with the principles just laid down, "here, then," says he, "we

GEN. V.
SPEC. VI.
Limosis
Emesis.

Tobacco
applied
to the
stomach.

Groundsel
applied
to the
stomach.

Sickness
from sym-
pathy;

from affec-
tions of the
head.

Hence from
swinging,
&c.
Sea-sick-
ness.
Ceases by
use.
Singular
instances of
accommo-
dation.

To produce
sickness,
the brain
must pos-
sess some
degree of
excitability.

* Edin. Med. Essays, vol. ii. art. 5.

GEN. V.
SPEC. VI.
Limosis
Emesis.

Treatment
to vary ac-
cording to
the cause.

perceive that the brain, being paralysed by a narcotic poison, is unable to lend its aid to the muscles requisite for the operation of vomiting, until its energies are restored by the anti-narcotic powers of a vegetable acid."*

In an affection resulting from such an infinite variety of causes, no one remedy or even plan of treatment can apply generally. Sympathetic sickness can only be radically removed by removing the idiopathic disease upon which it is dependent, though it may often be mitigated when very distressing, and the primary disorder is likely to be of long standing. The best palliatives, in most cases of this kind, will be found in carbonic acid gas; the saline draught, as it is called, in a state of effervescence, whether made with lemon juice, or, as first proposed by Riverius, with sulphuric acid; the more grateful carminatives; and small doses of opium.† When the stomach is overloaded, or irritated by bile or any other material

* Pharmacologia, p. 152. 5th edit. 1822.

† When long continued or frequent vomiting seems to depend upon morbid irritability of the stomach, the hydrocyanic acid, in doses of two or three minims three times a day, is an excellent medicine. The following case, related by Dr. Elliotson, exhibits the efficacy of this remedy. Eliza New had been ill five months, and had vomited every thing she had taken during fourteen days. She had been in a state of amenorrhœa for two months, and complained of pain across the epigastrium, and over the whole abdomen. Her tongue showed no feverishness; there was no thirst; no heat in the stomach; no heat in the throat; neither was there tenderness on pressure on any part of the abdomen; nor was the pulse accelerated. Under these circumstances, Dr. Elliotson inferred, that it was not a case of inflammation. The patient took the hydrocyanic acid as above directed, without any other medicine, or even being restricted to low diet; her vomiting ceased, and, in a fortnight, she was discharged from the hospital with her health re-established. When there is an affection of the stomach, Dr. Elliotson advises the practitioner to consider, in the first place, whether there be inflammation, or not; for, if there be inflammation, the hydrocyanic acid will not cure it; the case must be treated like inflammation of any other part of the body. But, if no inflammation can be detected, nor any cause for the vomiting in any other parts (as irritation in the intestines, the kidney, the womb, and ten thousand distant causes), then the hydrocyanic acid will relieve the vomiting better than any other medicine. As an anodyne, Dr. Elliotson has not generally found it of the least use, except in cases of pain of the stomach. He declares, that he has frequently seen vomiting, which has lasted for months, cease on the exhibition of the first dose of this medicine; though, he admits, that some cases of spasmodic vomiting will not yield, until it has been tried for a week. He also expresses his belief, that it will prove unavailing, unless the distinction be made between the existence of inflammation, and the influence of distant causes, on the one hand, and mere morbid irritability of the stomach itself, upon the other. He reminds us, that hydrocyanic acid is an exceedingly powerful medicine, and cannot be given in so large a dose when the stomach is empty, as when it is full. If three drops can be given three times a day after meals, it certainly will not be right to give more than one or two drops, when the stomach is empty. To avoid all confusion, he thinks it best always to give it after meals, and to begin with one minim diluted with water, or an aromatic water. In the course of a day, if no unpleasant effect be produced, the dose may be increased to two minims; and on the third or fourth day, to three minims; and so on until the desired effect, or some inconvenience, is felt. Although it will relieve the vomiting arising from mere morbid irritability, it will, if given too freely, produce extreme nausea, excessive vomiting, and perhaps violent pain in the stomach. See Clinical Lect., Lancet for 1830-1, p. 423. In pregnancy, it is very common for the stomach to become so disordered, that life is rendered miserable, and even endangered, by the constant vomiting, and inability to retain any food whatever in the stomach. Hence, in addition to venesection and leeches on the epigastrium, the hydrocyanic acid, strychnine, and conium, are the medicines in which Dr. Elliotson confides. See Med. Gazette for 1832-3, p. 659. — Ed.

that sits uneasily, the offending matter must be first discharged, and then the stomach restored to its proper tone and action by some aromatic cordial, or, if necessary, by narcotics. Food should at first be given in the smallest quantity, and of the lightest kind. A little toast and water alone, taken in small sippings, or a small spoonful of brandy and water, with a single morsel of sopped biscuit, will often sit easy when nothing else will remain; and gradually solicit the stomach to a healthful reaction. Stimulant cataplasms applied to the epigastrium are also frequently serviceable.

GEN. V.
SPEC. VI.
Limosis
Emesis.

When the sickness proceeds from a chronic debility of this organ, the lighter and warmer bitters, as the infusion of orange-peel, cascarilla, or columbo; or, where a more active stimulant is necessary, that of leopard's bane (*arnica montana*) may be found useful. The cinchona [except in the form of the sulphate of quinine dissolved in the compound infusion of roses] rarely agrees with the stomach. The oxides of zinc and bismuth are frequently useful. Sea-sickness is only to be cured by habit: yet it has often been rendered less distressing by small quantities of brandy, the aromatic spirit of ammonia, or laudanum.

[Vomiting is frequently only a symptom of disease of the stomach itself. This is the case in chronic inflammation of the organ, in scirrhus of the pylorus, and in ulceration of the mucous coat. When the latter membrane is either ulcerated, or merely weakened by any previous morbid change, the effort of vomiting sometimes occasions a laceration of the other coats of the stomach, and a fatal effusion of its contents in the abdomen is the immediate result.*]

SPECIES VII.

LIMOSIS DYSPEPSIA.

INDIGESTION.

THE APPETITE FASTIDIOUS; THE FOOD DIGESTED WITH DIFFICULTY; HABITUAL COSTIVENESS.†

THIS is by far the most complicated of all the disorders belonging to the present genus. The three preceding species may often be traced by themselves, or in a state of separate existence. Dyspepsy

GEN. V.
SPEC. VII.

* See J. N. Weekes on rupture of the stomach, in Med. Chir. Trans., vol. xiv. Lallemand, art. RUPTURE, in Dict. des Sciences Médicales. Examples are recorded, in which a fluid, containing urea, and having the sensible properties of urine, was vomited. In one interesting case, under Dr. Bright, in the Westminster hospital, the patient, a young woman, had been for three months unable to void her urine without the aid of the catheter. The particulars are mentioned in the Lancet for 1832-3, p. 704. — ED.

† "Lentour, difficulté, état pénible des digestions." (Dict. de Méd. et Chir. Pratiques, vol. vi. p. 387.) Such is M. Jolly's definition. Dyspepsia occurs in so many different affections, and under such a variety of circumstances, that many excellent physicians hesitate to set it down as a distinct and original disease itself.

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Limosis
Dyspepsia.

may be regarded as consisting in a combination of their respective symptoms irregularly intermixed; sometimes one set of symptoms taking the lead, and sometimes another; with a peculiar tendency to costive bowels, and especially that species of costiveness which we shall hereafter have occasion to denominate *coprostasis obstipata*, dependent on a weakly temperament or a sedentary habit, and in which the discharged feces, instead of being congestive and voluminous, are hard, slender, and often scybalous.

Symptoms
complex,
and often
shifting.

Dyspepsy, therefore, in the language of Dr. Cullen, may be described as "a want of appetite, a squeamishness, sometimes a vomiting, sudden and transient distentions of the stomach, eructations of various kinds, heartburn, pains in the region of the stomach, and a bound belly." Yet none of these are uniformly present, and all of them seldom. So that, as already observed, the symptoms of cardialgia, flatus, and emesis, with a few others, enter in irregular modifications into dyspepsia, as those of dyspepsia enter into hypochondrias. [Amongst the most constant symptoms of dyspepsia are, a furred tongue, flatulence of the stomach, and fretfulness, or depression of spirits. They may arise primarily from disorder or disease in the stomach itself; or they may depend upon an affection of the brain, liver, bowels, or some other remote or adjacent part.* The necessity of a careful discrimination of the original affection by the practitioner is quite manifest.]

Gravel
often a
symptom,
or sequel.

There is also another complaint, which frequently enters into the multiform combination of maladies, of which dyspepsy is the general expression, and which has rarely been noticed by writers, although it is often a very troublesome symptom, and that is, gravel. In treating of gravel, or lithia, as an idiopathic affection, we shall have to notice, that one of its chief and most common

Besides, as digestion is a complex function, in which the action of parts variously organized is concerned, its disorders must be very different in different examples, according to the tissue affected, whether nerve, muscular fibres, or a part, or surface, designed for secretion. Dr. Abercrombie, in considering dyspepsia, chiefly directs our attention to cases, in which the derangement is of a functional nature, or not connected with any change of structure, either of the stomach itself, or of any of the neighbouring parts. The muscular action of the stomach may be deficient, so that the alimentary matters remain in it too long, are imperfectly changed, and undergo chemical decomposition. 2. There may be a deficiency of the corresponding and harmonious intestinal action, interfering with the second stage of digestion, and giving rise to imperfect chylickation, and various morbid actions in the upper intestines. 3. The various fluids may be deficient in quantity, or morbid in quality. 4. If the mucous coat of the stomach be morbidly irritable, the muscular coat will probably be too easily excited to action, and substances will not remain in that organ a sufficient time for healthy digestion; but, after producing much uneasiness, will either be rejected by vomiting, or propelled in a half-digested state into the intestine, where they prove a new source of irritation. If the irritability occur in the intestine, the articles may undergo the proper change in the stomach, but be propelled too rapidly through the bowels for healthy chylickation. See Abercrombie's *Pathol. and Practical Researches on Diseases of the Stomach, &c.*, p. 73. ed. 2. These views will serve to correct and modify certain doctrines, delivered in the present section of the *Study of Medicine*. It may be observed, however, that the generality of writers insist on a weak torpid state of the alimentary canal in dyspepsia, and doubts are sometimes entertained about the soundness of the theory, which refers particular forms of this disorder to morbid irritability of the mucous coat of the stomach and bowels, independent of chronic inflammation. — *En.*

* See Armstrong's *Morbid Anat. of the Stomach, &c.*, p. 68.

causes is an excess of acidity in the primæ viæ; and, as such excess is almost constantly to be found in dyspepsy, gravel must frequently attend or follow, and is even a necessary effect where there exists what has been called a calculous diathesis. And, for a like reason, where there is a podagric diathesis, gout in some form or other is a frequent concomitant.

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Limosis
Dyspepsia.
Sometimes
gout.

The grand proximate cause of the three preceding species is debility of the stomach, whence, among other evils, an impaired secretion of gastric fluid. In the present instance, the debility is not often confined to the stomach, but extends to the intestinal canal, and the collatitious viscera, as the mesentery, the spleen, the pancreas, and especially the liver, in which it most frequently commences; and hence another cause of the great complexity of this disease.

Common
proximate
cause.

The debility, and indeed torpitude, of the intestinal canal is evident from the habitual costiveness, which so peculiarly characterises this affection. Whether this be direct or indirect, intrinsic or sympathetic, as harmonizing with the weakness of the stomach, it is not easy to determine: but nothing can be a stronger proof of the great inactivity of the intestinal tube, from whatever cause produced, than the feebleness of its peristaltic motion, notwithstanding the acrimonious matters that are so frequently diffused over its inner surface.

Proof of
debility in
the intestinal
canal.

The imbecility of the liver is equally obvious in most cases, from the small quantity of bile that seems to be secreted, or its altered and morbid hue, as evinced by the colour of the feces, which, in some instances, are of an unduly dark, and in others of an unduly light tint; and possibly from the inactivity of the intestines themselves, whose peristaltic motion is conceived by Dr. Saunders and other pathologists to be, in a great measure, kept up by the stimulus of the biliary secretion.

Proof of
imbecile
action in
the liver;

When the mesentery is affected, the chyme is generally obstructed in its passage to the thoracic duct, and the general frame, deprived of its needful nutrition, becomes flaccid and emaciated; and, from a collapse of the minute vessels on the surface, assumes a wan or sallow complexion.

in the me-
sentery;

It is highly probable that the pancreas and spleen are both also affected in many cases of dyspepsia. Of the actual part taken by either, in the process of digestion, we have already had occasion to observe that we know but little: but we do know, that the pancreas pours forth a considerable portion of the fluid which holds the solid part of our aliment in solution: while, in most of the cases of dyspepsy, brought on by a habit of drinking spirituous liquors, the spleen is evidently affected as well as the liver.

in the pan-
creas and
spleen.

It is in this state of the disease, that we frequently meet with that tenderness or other uneasiness in the epigastric region, and that peculiar hardness of the pulse, often accompanied by febrile symptoms, which Dr. Wilson Philip has pointed out as pathognomonic of what he calls a second stage of the disease.*

Second
state of the
disease.

It has also been well observed by Dr. Philip, that the lungs are, in many instances, apt to associate in the morbid action of the digestive organs, when it has become chronic, and to produce, as a

Catenation
of the lungs
with the
digestive
organs.

* Treatise on Indigestion, &c., p. 41. 8vo. London, 1824.

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Dyspepsia.

result, a peculiar variety (with him *species*) of consumption, to which he has given the name of dyspeptic phthisis.* The dyspeptic character of the disease, however, and especially the hepatic symptoms, together with those of lowness of spirits, flatulency, and other hypochondriacal affections, rarely fail to accompany it when complicated with phthisis, and point out its real source; and the cure must be chiefly directed to the primary malady, how much soever the induced symptoms may also demand our attention: for, it will be in vain to subdue the latter, while the former is still suffered to bear sway.

Primary
disease
sometimes
relieved by
secondary.

This
affection
becomes
a new
malady.

It must, nevertheless, be admitted, that, in some instances, the secondary disease seems to afford relief to the primary, and that the organ first affected recovers its health in proportion as that subsequently affected yields to the attack; in the same manner as, in erysipelas and the migratory forms of herpes, the eruption travels forward, the part relinquished heals, and fresh parts are affected in succession. In all such cases, the secondary complaint becomes a new malady, and must often be followed up under another principle and another mode of treatment. And, not unfrequently, we can very advantageously take a lesson from this peculiar march of nature; and, by exciting an artificial irritation in some neighbouring and less vital part, can draw off the morbid action into such quarter. It is by this means that blisters, setons, and other counter-irritants are so frequently found productive of the best advantage. And as a disease of the alimentary canal is thus sometimes communicated or transferred to the lungs, so a morbid state of the lungs is sometimes extended to the stomach, of which Dr. Gardiner has lately furnished us with a striking example.†

In chronic inflammation of the stomach, and even in that form of it which terminates in ulceration of the organ, and a fatal effusion of its contents in the abdomen‡, we also meet with several, and sometimes all the symptoms of dyspepsy; but as dyspepsy occurs here merely as a secondary or induced affection, it will be more regular to examine the nature and effects of this cause hereafter. §

General
languor
and
debility.

Under whatever form, and from whatever cause the disease occurs, there is a considerable degree of general languor and debility. Exercise or exertion of any kind soon fatigues; the pulse is weak; the sleep disturbed; the extremities are cold, or rendered so on slight occasions; and the tongue for the most part is furred, or covered with a creamy mucus, in the morning. Yet this last symptom is not always to be depended upon; for it is sometimes wanting in the disease, and sometimes common to those who have no such disease whatever, and are in the enjoyment of habitual health.

Collatitious
viscera con-
cerned in
the digest-
ive process.

That dyspepsy should be connected with a morbid condition of any of the adjoining organs, is by no means difficult to conceive, when we reflect that they are all concerned, directly or indirectly,

* Treatise on Indigestion, p. 323.

† Transact. of the Medico-Chir. Soc. of Edinburgh, vol. i. 8vo. 1824.

‡ See Abercrombie on the Pathology of the Stomach, &c. in Edinb. Med. and Surgical Journ., No. 78.; also in his Pathological and Practical Researches on Diseases of the Stomach, &c., p. 17. ed. 2. Edinb. 1830; Elliotson's case of ruptured stomach, in Med. Chir. Trans., vol. xiii. p. 31; also Louls in Archives Gén. de Méd., tom. v.

§ Cl. iii. Ord. ii. Gen. vii. Spec. xi.

in completing the great object of the digestive process, which is that of furnishing a constant supply of nutrition for the system at large. Digestion is commonly supposed to take place in the stomach alone; but this is an erroneous view, though the stomach may be regarded as the chief link in the great associate chain. In the stomach, as we have already seen in the proem to the present class, the food is only broken down into the pultaceous mass called chyme, and thus converted into the mixed principles of oil, gelatine, and sugar, and little else; for, though we have some traces of animalization, they are rudiments, and nothing more. Yet this, which is the first, is the most important stage of digestion; and its perfection depends upon the vital power. Where this is small or enfeebled, the process of chymification is necessarily impaired or interrupted: the wonderful machinery of the stomach, which finds no parallel, not only without the body, but in any other part of it, is disturbed or impeded in its operation; and its fluids are poured forth too sparingly or too inconditely.

The next stage of the digestive process takes place in the duodenum, which easily admits of distention, and receives the food in the form of chyme from the stomach. Here the bile, the most highly animalized of all the secretions, and abundance of the pancreatic juice, meet it, and a new play of affinities commences; the bile, as supposed by Fourcroy, being separated into two parts, its saline principles and its resin. The latter is discharged with, and gives a colouring matter to, the excrements; the former become decomposed, attenuate the chyme, communicate their azote, and thus complete its animalization; while the juice of the pancreas dilutes and holds the material in solution, and probably contributes to some other effect, but which has not yet been detected. In this liquid state, it is called chyle. The recrementary part, which descends into the larger intestines, is attacked, as it proceeds, by the mouths of a considerable number of lacteals, that drink up whatever small quantity of the chyle may be accidentally intermixed with it; while the great body of this fluid is absorbed in the duodenum itself, by an innumerable host of the same vessels which concentrate their mouths on its inner surface.

We thus see how largely the digestive process ranges, and from what a wide spread of organs, closely sympathising with each other, the disease of dyspepsy may proceed. But the finishing touch still remains to be added: the absorbed chyle, before it becomes completely assimilated, has to be exposed to the action of the atmosphere, and for this purpose has to travel to the lungs. What change it sustains in consequence of this exposure, will be the subject of a subsequent enquiry. At present it is sufficient to show the connection, which subsists between the stomach and the lungs in the common function of providing for the sustenance of the animal machine; and to indicate the means, by which a morbid action of the former may be communicated to, or lay a foundation for impaired action in, the latter; since, to say nothing of the sympathy of approximation, or of that sympathetic influence which is always found to take place between the extreme links of a chain that runs through any part of the animal machine, it must be obvious that if the chyle, which originates in the stomach, and, when in a state of health, communicates a peculiar stimulus to the

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SPEC. VII.
Limosis
Dyspepsia.

Part per-
formed
by the
stomach.
Chyme.

Chyle.

Chyle yet
to be
operated
upon by
ventilation.

Hence
close
connection
between the
stomach
and the
lungs.

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SPEC. VII.
Limosis
Dyspepsia.
Whence
dyspeptic
phthisis.

lungs, as it enters their substance in combination with the recurrent and exhausted blood, should be conveyed to them in an unhealthy condition, this peculiar stimulus may be changed in its mode or degree of action, and the lungs, in consequence, become a sufferer; more especially where they are predisposed to any kind of morbid action. And hence another origin of dyspeptic phthisis, which, like every other modification of the disease, may depend, therefore, upon imbecility of one or more of the digestive organs.

Causes of
dyspepsy
local and
general.

The common causes of this imbecility, whether confined to the stomach, or co-extensive with the associate viscera, may be contemplated under two heads, *local* and *general*; under both which they are still further resolvable into the two opposite extremes of deficient and excessive stimulation; and, consequently, into a divergency of any kind from that medium of excitement and activity, upon which health is made to depend.

Local
remote
causes.

The local remote causes are, a too large indulgence in sedative and diluting substances; as tea, coffee, and warm water, or similar liquids taken as a beverage; or an equal indulgence in stimulant and acrid materials, as ardent spirits, spices, acids, tobacco whether smoked or chewed, snuffs, a daily habit of distending the stomach by hard eating or drinking; or a rigid abstemiousness, and very protracted periods of fasting.*

General
remote
causes.

The general remote causes are, an indolent or sedentary life, in which no exercise is afforded to the muscular fibres or mental faculties. Or, on the other hand, habitual exhaustion from intense study, not properly alternated with cheerful conversation; becoming a prey to the violent passions, and especially those of the depressing kind, as fear, grief, deep anxiety; immoderate libidinous indulgence; and a life of too great muscular exertion. Perhaps the most common of this latter class of causes are, late hours and the use of spirituous liquors.

Dyspepsia is hence presented to us under several varieties, of which the two following are the chief:—

α Organica.

Organic indigestion.

Originating in the digestive organs, and principally confined to them.

β Enervis.

Enervate indigestion.

Originating in a relaxed state of the constitution from causes acting generally.

For both these, the general principles, that should govern us in

* The following facts are noticed by Professor Elliotson, in proof of the great length of time certain substances will remain in the alimentary canal, and be the cause of various complaints. In the Philadelphia Journ. for 1822, there is an account of a coagulum of milk, which was vomited two months after it had been taken. Dr. Elliotson has seen a coagulum of milk, like birdlime, which had remained a week in the stomach, producing the greatest uneasiness. Dr. Barlow has recorded an instance, in which sulphate of iron pills were discharged, per anum, a year after they had been taken. Dr. Elliotson has seen a piece of salmon vomited by an infant, a month after it had been swallowed. A boy swallowed thirty grapes without chewing them, and after three months' frequent vomiting and severe suffering, he was cured by an active purgative medicine; ten of the grapes came away whole even then. Lect. at London University, in Med. Gazette for 1832-3, p. 660. — Ed.

attempting a cure, are the same, though the means of carrying such principles into effect will admit of diversity.

Under what shape soever the disease may present itself, the first thing to be enjoined is a relinquishment of whatever cause has laid a foundation for it: we must next palliate the symptoms that aggravate and continue the disease; and, lastly, we must restore the debilitated organs to their proper tone; or, in other words, we must correct or remove what is called, though not very precisely, the proximate cause of the malady.

The patient must, in the first place, be convinced of the necessity of putting himself under a new rule of conduct, and be deeply impressed with the idea that, though he may have continued his late plan of life for a considerable period of time without having sensibly suffered for it, yet, now that he is suffering, nothing but his conforming to another plan will remove his present complaint.

Severe and long continued study*, protracted, as I have often known it, through ten hours a-day for many months, without any relaxation or interchange of pursuit, must give way to the exercise of walking or riding, and this not occasionally, but daily; and to the still better cordial of cheerful conversation. The last is of very great importance; and without it even exercise itself will be of little avail: for the mind, accustomed to a certain track of intellectual labour, will otherwise relapse, even while riding or walking, into the same habitual course, be dead to the most fascinating prospects around it, and become exhausted by its own abstraction. And it is to characters of this kind, perhaps, more than to any other, that the amusements of a watering-place promise ample success; where the general bustle and hilarity, and the voluntary forgetfulness of care, the novelty of new scenes and new faces, and new family anecdotes, and the perpetual routine of engagements, that fill up the time with what would otherwise be trifles and frivolities, reverse the mischievous order and monotony of the past, break the sturdy chain of habit and association, and give leisure to the worn-out sensory to refresh itself.

Where the same effect has proceeded from a town life of fashionable follies and dissipation, nothing is more common than to recommend a like change of residence: but in this case, though it may be a change of residence, it is not a change of life; and hence it is too often made without any benefit whatever. A total retreat from the world, the unbroken seclusion of a remote hamlet, the sober society of a few intimate friends, simple meals, and early hours; instead of close and heated rooms, crowded and motley routs, costly feasts, and midnight madrigals, are what are specially called for in this instance, but are not always to be met with in the resort of a watering-place. In such as are still distinguished for their quiet and unfrequented shores, where all is rude and simple, and spruce squares and long-drawn parades have not yet put to flight the scattered and irregular cottages of former times, these advantages may still be obtained. But it is rarely that

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Medical
treatment.

First intention, an abandonment of whatever may have been the remote cause.

Exercise and cheerful conversation.

For the dissipated, a retreat from fashionable life.

* "Le cerveau est, sans contredit, l'organe dont les affections réagissent avec le plus d'énergie sur l'état des digestions. — Il suffit même que le cerveau, fortement préoccupé, n'apporte plus à l'acte de la digestion le concours de son influence, pour qu'il y ait dyspepsie." Jolly in Dict. de Méd. et Chir. Pratiques, t. vi. p. 387. — ED.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

patients, who are suffering from a life of dissipation, will consent to relinquish the higher attractions of our gayer and more public retreats, for what they are apt to esteem the dulness of an unfrequented coast, till it is of little importance whether they go any where, or remain at their own homes.

For the free
liver, plain
fare and
early hours.

In like manner, the habitual use of hard eating and drinking must give way to a wholesome plainness of diet; though I am afraid that not a little mischief has often ensued from rigidly compelling the man, who is suffering from a long habit of the former, to abandon this habit at once, and run to an extreme of abstemiousness. Nothing can be more injurious. Even in full health, the animal frame, though it may be brought to any extreme by degrees, very ill brooks abrupt changes; and I have often seen, where such changes have been attempted in an enfeebled constitution, that they have introduced worse complaints than they have been intended to remove. The use of tobacco is not, in our own day, employed very often to such excess, whether in smoking or chewing, as to become a very alarming cause of dyspepsy: but I have known instances where the former has been suspected, though perhaps unjustly, of having been the cause of this complaint, and where an abrupt prohibition of its entire use has introduced a dangerous atrophy.

How far
the use of
tobacco is a
cause.

It is certain, however, that a free use of tobacco, under either or any form, has produced very severe dyspeptic affections; and, consequently, in such cases, it ought to be relinquished by degrees. Nor is it difficult to conceive by what means tobacco thus acts; for, like opium, it is a stimulant readily producing a narcotic effect, or, in other words, rapidly exhausting the sensorial power. In chewing, a considerable portion of tobacco is conveyed to the stomach along with the saliva: in smoking, a somewhat smaller quantity is conveyed in the same manner; and, in both, the salivary glands are excited to a great waste of secretion; which cannot take place without impairing the chymifactive process indirectly, as the introduction of the tobacco into the stomach impairs it more immediately. The areca, or Malabar nut, though a good bitter, when chewed for a long time, is well known to impair it in the same manner. Even in the form of snuff, tobacco has not unfrequently been found to produce the same result; partly, perhaps, from the paresis of the olfactory nerves, in which the stomach participates by sympathy, and partly from the portion of tobacco that is constantly passing into it from the nostrils. "I have found," says Dr. Cullen, "all the symptoms of dyspepsia produced by snuffing, and particularly pains of the stomach occurring every day. The dependence of these upon the use of snuff became very evident from hence, that, upon an accidental interruption of snuffing for some days, those pains did not occur; but upon a return to snuffing the pains also recurred; and this alternation of pains of the stomach and of snuffing having occurred again, the snuff was entirely laid aside, and the pains did not occur for many months afterwards, nor so far as I know, for the rest of life."*

Areca, or
Malabar
nut.

Snuffing.

Dr. Cullen tells us, in another place, in proof of the same fact, but in proof, also, that the habit is sometimes variable in its influence,

that he knew a lady, who had been for more than twenty years accustomed to take snuff, and that at every time of day; but who came at length to observe that snuffing a good deal before dinner took away her appetite; and that even a single pinch taken at any time in the morning, destroyed almost entirely her relish for that meal. When however she abstained entirely from snuff before dinner, her appetite continued as usual; and after dinner, for the rest of the day, she took snuff pretty freely without any inconvenience.*

Not in manner of life alone, but in manner of food, should we rigidly proscribe whatever we find to be a cause of indigestion. And hence dyspeptic patients should pay a particular attention to themselves, so as to discriminate between the viands that sit easy on the stomach and those that render it uncomfortable; for nothing in a morbid state is more capricious than this organ, and twenty different cases may perhaps demand as many varieties of regimen. Thus tea of all kinds, and especially green tea, is generally accounted a narcotic. Dr. Smith and Dr. Lettsom endeavoured to trace up its narcotic principle by experiments, and it is to this principle that Dr. Cullen ascribes the deleterious effects it produces upon some stomachs. Yet, while it acts as a narcotic upon many persons, upon others, and myself among the rest, it proves powerfully agrypic; and, if taken on going to bed, keeps up wakefulness through a great part of the night.†

We must first then prohibit, in our endeavours to effect a cure, whatever we know to be a local or general cause of the disease. Our next intention should be, to palliate the symptoms that aggravate and continue it.

As the stomach is often overloaded with crudities and acidity, Dr. Cullen recommends an emetic at the outset. I have rarely found this of use: it often adds to the debility of the stomach; and at most is only of service for a few hours. For so long as the cause continues by which an accumulation of undue materials is produced, this effect will be perpetually taking place, and an emetic might be necessary every day.‡ The most rational mode of prevention is, to limit the stomach to such food as it will most easily

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

Case in
which it
took off th
appetite;

Stomach
often capri-
cious, but
whatever
disagrees
with it to
be avoided.

Tea nar-
cotic to
some;
agrypic to
others.

Second in-
tention, to
palliate the
symptoms

Emetics,
how far
useful.

* Op. citat., p. 274.

† Amongst the causes of indigestion deserve to be enumerated, imperfect mastication from loss of the teeth, or from the habit of swallowing the food too rapidly; sympathy of the stomach with the uterus, brain, kidney, or other organs, and violent emotions of the mind. Then, as Professor Elliotson justly observes, with reference to dyspepsia dependent on the stomach and intestines, there may be either a real debility of them, an inflammatory state, or an organic disease of them: excesses at table debilitate and destroy the tone of the stomach. Chronic inflammation of this organ is likely to be brought on by constant irritation of it. When organic disease occurs, the cardia, or pylorus, is generally the seat of it; but there may be ulceration, or a thickening, or a softening, of the texture of any portion of the stomach. See Med. Gazette for 1832-3, p. 658. — Ed.

‡ On this point, Dr. Elliotson's advice is judicious:—"Suppose that any thing injurious in its quality, or in its quantity, is the cause, the shortest way is to give an emetic, and empty the stomach, and it is much best to give one that does not produce nausea, but an evacuation. The sulphate of zinc is as safe as any you can exhibit." In fat, short-necked subjects, he recommends bleeding to be practised before an emetic is given, which is to be followed by the exhibition of calomel, senna, and salts. — Ed.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

Gentle
stimulants.

A-spare
diet often
injurious.

Flatulency
to be cor-
rected, and
how.

Acidity a
cause of
eructation.

Magnesia,
its use.

digest; to allow it in small quantities; to quicken its removal by gentle aperients that may increase the peristaltic action, and warm tonics that may invigorate the digestive organs. A spare diet, however, though often recommended, is rarely found of service, and very generally adds to the disease: for, as the stomach and bowels have been accustomed to the stimulus of food, and a certain degree of impletion, if this be not maintained the atony will be increased, the natural function still further impaired, and all the symptoms of uneasiness be aggravated. A moderate proportion of excitement and impletion is hence imperiously called for; and our discretion is principally to be exerted in determining the nature of the viands, and the degree of impletion, which will best agree with the stomach, and which it may most easily master.

For the correction of flatulency, most of the carminatives noticed under the fifth species of this genus may be conveniently had recourse to; and for that of acidity, lime-water, the acidulous alkaline waters, the carbonates of soda and potash, and the absorbent earths. Magnesia is a remedy of peculiar value for this last intention. In some cases of great obstinacy, but evidently dependent upon a chronic tendency to an acetous fermentation, magnesia, given in the proportion of an ounce a day, has effected an entire cure*: and in all cases it resists the costiveness as well as the acidity, and is far less disposed to coacervate in the alimentary canal, than the calcareous earths. It is also, as I have already observed, a powerful antidote against that class of calculous concretions in the kidneys and bladder that depend upon an acid principle.

The eructations that occur in dyspepsy, however, are not always acid. They are often of a compound and very offensive taste, and give to the breath the smell of carburetted hydrogen gas, or rotten eggs: as though the gastric juice were incapable of performing its proper office, and the food were retarded in the stomach till the process of putrefaction had commenced. In this case, instead of avoiding acids, we should recommend a free use of them, from whatever quarter they may be obtained; as they not only tend to correct the fetor, but to strengthen the stomach. The mineral are the most powerful; and of these the sulphuric is by far the pleasantest. It may advantageously be employed as a medicine; but for acidulated diet-drinks it must yield to the vegetable acids. These are of three kinds, native, distilled, and such as are obtained by fermentation. The first are commonly the most grateful, and especially when they exist in the form of fruits; but they are apt in weak stomachs to set free a large quantity of air, and consequently to produce a very troublesome flatulency, and even promote the acescent disposition of the organ. The citric and the oxalic may be exceptions; and there may be also a few others, but they are not numerous; and where these cannot be procured, we must have recourse to the acids elaborated by distillation, or a fermenting process. The last are called vinegars, whether obtained from malt, weak wines, or sugar; and being of themselves, when properly refined, very pure and dilute, they are capable, with a little care, of being rendered highly grateful.

Costiveness is a symptom of dyspepsy still more common than

* See Dr. Watson's communication, *Medic. Observ.*, vol. iii.

Acids when
useful.

Mineral
acids.

Vegetable
acids.

Compara-
tive value
of the dif-
ferent
kinds.

acidity, and one that requires a very vigilant attention. In our attempts to remove it, we should always bear in mind that it is a chronic and not a temporary concomitant; and, consequently, that violent purgatives are of all things to be avoided; and that such aperients should be preferred which act gently, and rather by soliciting the peristaltic motion of the bowels to the regularity of health, than by irritating them to a laborious excitement.

Rhubarb is, for this purpose, one of the best articles in the *Materia Medica*; for, while by its aperient power it relieves the present distress, we cannot have a much better tonic than its bitter. Where the bowels are merely sluggish, it will prove sufficient without any other cathartic; though it is better to combine it with soap and such aromatics as agree with the patient. It is often however incompetent of itself; and in such cases derives, in the form of an extract, a valuable assistance from half the quantity of the extract of aloes, or the compound extract of colocynth.*

Since the publication of M. Daubenton's little tract in an English dress, very small doses of ipecacuan, not exceeding a grain or a grain and a half, have been extensively tried, upon the recommendation of this celebrated physiologist. The intention appears to be that of exciting a change of action in the secretions of the stomach; but, notwithstanding the advantage which is said to have been derived from this medicine by the writer himself, it does not seem to have succeeded in this country; and, indeed, the dose is so small that little effect of any kind seems capable of being produced by its use. By some writers it is supposed that, in such minute proportions, it will slip over the pylorus, and prove aperient by acting on the intestines. I have rarely, however, found it to do this alone, though it is a useful auxiliary with aperients of a more decided character. And where there has been great irritability of the stomach, I have known it even in the dose of a single grain excite so much nausea as to prohibit its further use. Far more service has occasionally been produced by an external application of the tartar-emetic ointment, made in the proportion of four scruples of the tartarised antimony to an ounce of spermaceti cerate; the quantity of a hazel-nut being rubbed in every night till the eruption consequent upon this application appears. In numerous diseases of the digestive organs, and particularly those of the stomach and liver, this kind of counter-irritation has been found highly useful, probably from the influence, which is often produced through the whole length of a nervous fibre and its connecting branches or intersec-

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Costiveness
to be corrected, and
to what extent.

Rhubarb;

combined
with stimulants,
and other
medicines.

Small doses
of ipecacuan, how
far useful.

Tartar-
emetic
ointment.

* One thing particularly advised by Dr. Abercrombie is, to regulate the bowels, by the daily use of very small doses of laxatives, combined with tonics, so as, without even purging, to imitate at all times that moderate, but regular action, which attends the most healthy state of the bowels. For this purpose, various combinations answer; such as columbo powder, with carbonate of potass, and a few grains of rhubarb, taken once or twice a day; sulphate of iron with aloes; sulphate of quinine with aloes, or rhubarb, and a few grains of ginger; oxide of bismuth with rhubarb or aloes. See Abercrombie, *op. cit.*, p. 79. Dr. Elliotson considers one of the best remedies for this state to be a very minute quantity of croton oil—about $\frac{1}{12}$, $\frac{1}{6}$, $\frac{1}{3}$, or $\frac{1}{2}$ of a drop, given regularly with rhubarb and colocynth; and, if it should gripe, a small quantity of aromatic oil should be added. The patient may take a pill of this kind every night, and one copious stool will be produced by it in the morning. (See Elliotson's *Lect. in Med. Gaz.* for 1832-3, p. 660.)—ED.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

Quicksilver
pill, when
advisable.

Oxide of
bismuth, or
pearl-
white.

Chief in-
tention to
restore the
tone of the
stomach
and system
generally.

Both ob-
jects con-
sistent.

Stimulants.

Astrin-
gents and
bitters.

tions, in consequence of exciting its extremity. It is to Dr. Jenner we are chiefly indebted for the attention which has lately been bestowed upon the nature and effects of this singular remedy*, though it was occasionally in use long before his time.

The quicksilver or blue pill will also generally answer a good purpose; but it is chiefly to be employed where we have reason to apprehend, that the one or both the portals of the stomach, and especially the pylorus, is in a scirrhus state; or that the dyspepsy is connected with a morbid condition of the liver, or some other allied viscus. In this case, much benefit has also been derived from the white oxide of bismuth, now more generally known as a cosmetic, under the name of *pearl-white*. For scirrhus affections of the stomach it has been tried successfully by Carminati, of Pavia; and apparently with equal advantage in France.† Independently of its discutient power, it has the virtue of allaying irritation in general; and, on this last account, Dr. Odier, of Paris, has employed it satisfactorily in most of the acute diseases of the alimentary canal, especially in pains of the stomach, diarrhœa, and colic, as he has also in hysteria, and even in tooth-ache.‡ The best form of giving it is that of pills, in doses of from four to ten or twelve grains, four or five times a day.

In the meanwhile, we must never forget, that our primary object is to restore the stomach, or the system at large where the stomach is only secondarily affected, to its proper tone and strength.

The general plan, as I have already hinted, must be the same; for, as the virtues of medicines can only be communicated to the system at large through the medium of the stomach; and as the state of the latter has at all times a powerful influence upon the former; there can be little doubt that, by improving the digestive function, the vigour of the system will be improved generally at the same time, and consequently that the energy of the whole of the moving fibres will be increased: while the collateral means of cure that are applied externally, as those of air, exercise, and sea-bathing, and which are chiefly designed to operate on the system at large, will convey an equal advantage to the stomach.

The principal evils we have to encounter in dyspepsy are deficient action, and a relaxed state of the fibres. For these, there are three classes of remedies to which we may have recourse; stimulants, to increase the action; and bitters and astringents, to augment the tone. The first, however, are of a very doubtful advantage; for a lax state of fibres will bear very little increase of action without incurring an equal increase of debility; and hence stimulants can never be recommended alone, except in cases of emergency, as to remove a severe fit of pain or other inconvenience, and then only for a short period of time; but they may be combined very advantageously with either astringents or bitters, and particularly with those medicines that possess these qualities jointly.

Bitters, besides restoring tone where it is wanted, have another

* Letter to C. H. Parry, M. D., F. R. S., on the Influence of artificial Eruptions in certain Diseases, &c., 4to. 1822.

† Beaumé, Journ. de Méd., tom. lxxiv. Heufland, Neue Annalen, band i. p. 351.

‡ Journ. de Méd., tom. lxxviii.

and more immediate advantage in the disease before us: for they directly attack that tendency to fermentation in the stomach which is one of the most prominent features of dyspepsy, and which is, indeed, the chief cause of the flatulence and acidity that so generally accompany it. Of this we have no doubt; for the experience of every day brings its testimony; and we employ bitters, as hops and quassia, for this very purpose in our fermentable beverages.

Stimulants, astringents, and bitters, are then, the three classes of medicine, with which we are to make inroad against the intrenchment of dyspepsy. They may often be conveniently united, and have their forces hereby increased in a more than double proportion. The stimulants, indeed, ought rarely to be employed by themselves, except in spasmodic pains, or some other temporary extremity. Many of these may be found in the list of carminatives already described under the species CARDIALGIA.

I have observed that dyspepsy is often grafted upon an hysterical or hypochondriacal diathesis; and in these cases, we may indulge in stimulants of a much warmer character, as camphor itself, assafoetida, the alliacea, the spicy aromatics, and even capsicum. Of the last it may be remarked, that, though the hottest of all the peppers, it has a less tendency to produce complaints of the head than any of the rest. It is one of the best carminatives possible in the case of flatulency from vegetable food, and admirably calculated to remove that stony coldness, which distresses a weakened stomach when attacked by a transfer of gout.

In selecting from among the simple bitters, we need not be particularly nice, for their principle is the same; the quassia perhaps possesses it in the highest degree, though some have doubted of this; then the gentians; and next to these columbo. Of the gentians the most powerful seems to be the *g. purpurea*, first imported into this country by Dr. Home, from Norway, and then known by the name of *cursuta*, from its Norwegian name *skarsote*. As a simple bitter it is best to unite it with some aromatic. The tincture of gentian of the London College, which is an improvement upon Stoughton's or the stomachic elixir, by exchanging the cochineal for the smaller cardamom seeds, is an excellent form for occasional use; but as alcohol should be habitually abstained from in the disease before us, it cannot be employed alone in such quantity as to promise any real benefit, though it may be allowed to enter as an ingredient into more compound remedies.

The bitter of the columbo is combined with a slight and not disagreeable pungency, and has an aromatic smell. It is hence peculiarly calculated for dyspeptic affections, and in most cases will sit easy on the stomach, in the form of powder in doses of fifteen or twenty grains; and will often give a check to sickness where bile is not present, more than any other medicine we can employ. It is singular, that, to the present hour, we are unacquainted with the plant that furnishes this excellent drug. Commerson believed it to be a species of *menispermum*; and Willdenow a species of *bryonia*. [Formerly, the root was erroneously supposed to be named from the capital of Ceylon, which was regarded as the place from which it was exported. But according to Dr. A. T. Thomson, it is now known to be a staple article of export with the

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

Stimulants
of most
service in
unison with
them.

Where the
more
powerful
stimulants
may be
employed.

Capsicum.

Simple
bitters.

Gentian.

Columbo.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

Portuguese at Mozambique, whence an entire root was taken to Madras by M. Fortin, in 1805, and a plant raised from it there by Dr. Anderson. From a drawing in the possession of the Linnæan Society, the plant appears to be of the natural order of Menispermæ; but the genus cannot be determined, in consequence of the female flowers not having been as yet seen.*] It seems to have been first noticed by Redi in 1685.†

Chamo-
mille.

As a plant uniting the two principles of an essential oil, warm without being unduly stimulant, and a powerful bitter, the chamomile is, for the purpose before us, one of the best remedies. It may be taken in a watery infusion, or an extract; but if in the former, the menstruum should be closely covered, that as little as possible of its volatile aroma may fly off; and the infusion should not be continued for longer than an hour; and perhaps a shorter period may suffice.

Cinchona.

Cascarilla.

As we have medicines that unite the two qualities of bitterness, and a stimulant or aromatic warmth, so we have those also that unite the two qualities of a bitter and an astringent; of which the cinchona furnishes us with a striking example: and hence this medicine has been long, and deservedly, one of the most popular of any for debilities of all kinds, whether of the digestive organs alone or of the system generally. The cascarilla bark has pretensions of a like kind, but far inferior in degree, notwithstanding the high encomiums that have been paid to it by the Stahlian school, which endeavoured to hold it up as a rival to the cinchona. There are many stomachs, however, which will not bear the latter, even in decoction or infusion; and in such cases, either the sulphate of quinine, or, in lieu of this, the cascarilla, may be prescribed.

Acids as
astringents.

The acids, both mineral and vegetable, are valuable astringents, in particular states of the stomach resulting from dyspepsia; but, it is obvious, that, from the tendency of this organ to co-operate in so many cases in the production of a superabundant acetous fermentation, acids cannot at all times be had recourse to. I have occasionally, indeed, employed the mineral acids, and particularly a mixture of the nitric and muriatic acids, in the proportion of one part of the former to two of the latter, for the purpose of checking this tendency to acidity, in several instances with success; but the plan has not answered generally; and it will hence be better to limit this class of medicines to the intention I have already pointed out, or to delay them till we have by other means overcome the disposition of the stomach to this morbid action.

Prepara-
tions of iron
and zinc.

The other mineral astringents, which have been employed besides acids, are not numerous; and may be limited to the preparations of iron and zinc. As general tonics, these, under different forms, have proved very extensively successful; but they are less adapted to dyspepsy proceeding from primary imbecility of the stomach or its adjuvant organs; or I should rather, perhaps, say, that they are apt to disagree with these organs till they have been restored to some increased degree of tone, beyond what they usually possess when medical aid is sought for.

I have observed, that there is always some degree of acid exist-

* London Dispensatory, 2d edit., p. 78.

† Experimenta circa Res Naturales, p. 142.

ing in the stomach in a healthy state; and we have seen, that one of the most troublesome symptoms of dyspepsia is a morbid increase of this principle. And hence, upon an idea that the acid, if thus formed in the stomach, may of itself be sufficient to answer the purpose of the sulphuric, and reduce the particles of the metal to a due degree of tenacity, both the zinc and the iron are also frequently employed in the simple form of filings, rust, oxides, or calces; and often with the happiest success. And that an acid adequate to this end does in most cases exist in the stomach is sufficiently proved where the rust of iron is employed, by the black colour of the stools, which may be regarded as a test of the proper solution of the iron; as it may be also of the existence of bile in a state of healthy bitterness: for it is by a combination of the iron with the bitter principle of the bile that this blackness, which is a natural ink, and obtained by the same means as artificial ink, is produced. Some animals have a power of forming this sort of natural ink at option, as the sepia or cuttle-fish, but whether by a solution of iron, I cannot undertake to say. This, however, is very probable, if it be used, as it is generally understood to be, by the Chinese, as an ingredient in the manufacture of Indian ink. The cuttle-fish, when exposed to danger from the attack of an enemy, throws it forth very freely, employing it, indeed, as a means of defence; and effecting his escape by thus converting the water around him into a black muddiness, that sufficiently conceals him from view.

It is on this principle that the flowers or oxide of zinc have, by many physicians of great reputation, been preferred to the sulphate; and it is certain, that, in the form of an oxide, we can introduce a much larger quantity either of zinc or iron, than in that of a salt: but it does not follow from this fact, that the metal may be more efficacious; for, from the doubtful measure and strength of the acid existing in a free state in the stomach, there may not be enough to dissolve or form a salt, with the whole of the dose, and consequently a considerable portion of it may be lost, or remain inert. And, on this account, I think it better to have recourse at once to the sulphate of both these metals, whenever it is judged expedient to employ them, than to trust to the chemical changes that may take place with so much precariousness in the stomach.

In employing the metallic salts, and, indeed, tonics of every kind, in disabilities of the stomach, it is a good rule to begin with small quantities, and advance to a full dose by degrees; thus reversing the method that it may often be found advantageous to follow in acute diseases, when the life of a patient may depend upon a bold practice, adopted instantaneously, and gradually remitted, as soon as the object has been obtained. The chronic character of dyspepsy, on the contrary, allows us time; and as no two stomachs will perhaps bear the same precise dose of a remedy, with the same precise effect, on account of the caprice of this organ in a deranged state, it is better to feel our way before us, and to reach the proper point by degrees; for, if we over-dose the patient at first, we add to the disease, instead of opposing it, and require many days, perhaps weeks, to bring him back to the actual state in which we found him.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Simple
metallic
prepara-
tions unite
with the
acid of the
stomach.

Sulphates
preferable
to oxides.

Small doses
at first, to be
increased
gradually.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

Voltaism
applied to
the sto-
mach.

Prussic
acid.

In conjunction with this internal treatment, it is probable, also, that an external application of the voltaic power to the stomach may increase its energy. In the hands of Dr. Wilson Philip, it appears to have been of decided advantage.

[According to the reports of Dr. A. T. Thomson, Dr. Granville*, and Dr. Elliotson†, the prussic or hydrocyanic acid is a valuable medicine in dyspepsia, connected with morbid irritability of the stomach. Eighty years ago, it seems that nurses were in the habit of relieving the flatulence of infants by putting into the pap a laurel-leaf‡, the virtue of which is supposed to have depended upon its containing a minute quantity of the acid under consideration. This remedy, however, was distinctly praised by Sprengel, in 1814, for its good effects in complaints of the stomach, dyspepsia, and hypochondriasis§; and even at earlier periods, for these and other cases, by Hufeland, Haller, Swediaur, and others. The dose for commencement may be one minim of the diluted acid, thrice a day, gradually increased to three. Strychnine, hyoscyamus, and conium, are other medicines, calculated to lessen morbid irritability of the stomach: in the case which attends pregnancy, venesection, leeches to the epigastrium, and either some of these medicines, or the prussic acid, may be tried.¶ One of the most distressing symptoms, sometimes attending dyspepsia, is uneasiness in the chest, with occasional fits of palpitation; while, in primary organic diseases of the heart, many of the most troublesome symptoms of dyspepsia also occur, particularly flatulence. In such cases, Dr. Macleod¶ recommends the exhibition of hydrocyanic or prussic acid, as a means by which the patient's sufferings may be considerably lessened. In one instance of diseased heart, accompanied by dyspeptic complaints, ten drops of diluted prussic acid were prescribed in a five-ounce mixture, of which two table-spoonfuls were taken at first three times a day, and afterwards the whole quantity in the course of twenty-four hours. From Dr. Macleod's account, the medicine rendered the patient's journey to the grave much more bearable, than it would otherwise have been.]

General
rules.

While, however, a proper course of medicine is pursued, a proper course of diet and regimen must accompany it, or, with the utmost professional skill, we shall make no progress. And hence, to the remarks already made at the outset, that, where the disease has been brought on by a life of indolence, sedentary occupation, or too free indulgence of any kind, the general habit must be changed, and regularity of meals, sleep, and exercise be rigidly insisted upon, it is necessary to add a few other observations to the same purport.

Diet and
regimen.

One substantial meal of solid animal food daily is sufficient for a man in full health, engaged in a life of ordinary labour. Yet there are many who, without any labour, are from a long habit, obliged to take two or even three. But the habit is bad, and cannot too soon be broken through. It follows, therefore, of necessity, that,

* Historical and Practical Treatise on the Hydrocyanic Acid in Pulmonary Consumption, &c., 2d edit., 8vo. 1820. Also, Farther Observations, &c., 1819.

† Numerous Cases, illustrative of the Efficacy of the Hydrocyanic or Prussic Acid in Affections of the Stomach, &c., 8vo. 1820.

‡ Langrish, Phys. Exp. on Brutes.

§ Pharmacologia.

¶ See Lect. in Med. Gazette for 1832-3, p. 659.

¶ Med. Phys. Journ.

where the stomach is weak, the toil of digesting one full meal of animal food is the most that should be put upon it. This should take place as nearly as may be to the hour of noon, certainly not later than one or two o'clock, so as to occupy the middle of the wakeful period. The animal food should consist of one dish only; and be confined to such as is lightest of digestion, or as the peculiar state of the stomach may call for: for, in both these respects, there is a considerable difference. Thus shell-fish do not always agree with weak stomachs, and will sometimes excite great uneasiness, with pyretic heat, and even throw out a nettle-rash, or some other cutaneous eruption. Yet where they sit easy and are relished, several of them, as the crab and lobster, are found to neutralise acidity in the stomach more readily and effectually, than any other kind of animal food: an effect we should little predict, considering that they give out, on a chemical analysis, a smaller proportion of ammonia than the flesh of quadrupeds, birds, or even amphibials. The food of young animals is less nutritive than that of old, but it is, in general, digested with less irritation. Many writers have arranged the different animals that furnish food in tables, founded upon their supposed degree of nutriment. But they have drawn them up with considerable variations; in some instances apparently according to their own fancy. I have not space to enter into a comparison of these, nor is it necessary. Those who have leisure for such a study may turn to Dr. Darwin's, which is perhaps one of the best, and which they will find in his *Zoonomia*. Generally speaking, the tenderest food is that of the gallinaceous birds: then that of the ungulated quadrupeds; among which the stag, or cervus kind, claims the pre-eminence; and to this succeed the ox, sheep, and hare, in the order in which they are here placed. Yet it should be observed, that the last, though less nutritive than the preceding, is more easily digested than several of them; as it should also, that the flesh of animals in their wild or native state, though less coveted by a pampered palate, offers a more wholesome and digestible aliment, and is more perfectly animalized, than that of animals cooped up and fattened for the table. Below the hare, we may place the web-footed birds that are ordinarily brought to market; and below these, the oyster and lobster tribes, and lastly the numerous genera of fishes. The simpler the cookery of all these the better; for the complicated processes employed to give new forms to the productions of nature, or even to break them down for the use of the stomach, and thus keep the masticatory organs in a state of indolence, injure, instead of promoting, the health of a dyspeptic patient. We have already observed, that the saliva forms an important part in the chemistry of digestion, and it is best applied to the food when first secreted and in the act of mastication; and hence, if this act be prevented or suppressed, the food is without one of its auxiliaries. It is on this account that concentrated jellies, and all mashed dishes, sit more uneasily on a weak stomach, than meat taken in a solid form.

The vegetable nutriment should be such as is least disposed to ferment in the stomach; and hence all kinds of new bread, sweet preserves, confectionery, and pastry must be sedulously avoided; and the crust of bread, toasted bread, and unleavened biscuits take their place. The farinacea, whether seeds or roots, as rice, wheat,

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

What foods
are most
tender
among
animals.

Cookery
cannot be
too simple.

What vege-
table foods
allowable.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

flour, in the form of light and simple pudding, and potatoes, may be allowed in moderation. Water too is the best beverage; but where there is great flatulency, a small portion of brandy may occasionally be added. The only condiments that can be conceded are salt and spices: pickles might be admitted where acids constitute a part of the medical treatment; but they are disposed to provoke a false appetite, and hence to weaken the stomach by overloading it.*

Mischiev-
ous ar-
rangement
of fashion-
able meals.

From fixing the principal meal so near the hour of noon, it is clear that we suppose the day to commence at a very different period from the ordinary regulations of fashionable life; in which the bed is rarely quitted before nine or perhaps ten o'clock, after a night of imperfect and feverish sleep, when the languid idler immediately proceeds to a breakfast of tongue, ham, and eggs, in addition to the ordinary materials of his meal, as though he had been already labouring in the field for two hours; and, by means of their combined stimulus, fills his stomach with a load which might indeed do good to the husbandman, but to himself proves nothing more than a mischievous oppression. Yet to this morning toil of the stomach succeeds, at about two o'clock, the ordinary luncheon in a still more solid shape; followed in the evening by a dinner of numerous courses, with high-seasoned condiments and a stimulating change of wines; the real business of this vain and frivolous life perhaps not commencing till the better-disciplined peasant has begun his quiet sleep: when, roused by a flow of factitious spirits, and primed for gaiety and gallantry, the votary of pleasure, as it is called, sallies forth to join his comrades at the allotted place of rendezvous, and to pass the midnight in hot and crowded ball-rooms, or in orgies of a still more exhausting nature. Of the whole of this career, the only rational part of it is the luncheon a little after mid-day: this may be copied by the invalid before us, as his dinner, but from all the rest we must carefully shut him out. He should quit his bed by six or seven o'clock in the morning in the summer, and by seven or eight in the winter; and, after having risen for an hour, he may partake of a light breakfast of milk, cocoa, sassafras, or any other aromatic or warm-flavoured tea, with toasted bread, the crust of bread, or sea-biscuits, as observed already. The morning may be devoted to such exercises or recreations as may be most agreeable without producing fatigue. To this will succeed the chief meal of the day, upon the plan already laid down; and a light refreshment of the same nature as the breakfast should conclude the daily diet, a few hours before retiring to rest, which should never be later than eleven o'clock. Sea-bathing, or the shower-bath, before breakfast, will considerably add to the means of improvement wherever these advantages can be enjoyed, and particularly when the warmth of the season may give them the character of luxuries.

Rising,
exercise,
refresh-
ment, and
rest.

No system
of dietetics
applicable
to every
individual.

[The systems of dietetics offered to the world are innumerable,

* On the subject of Dietetics, the reader may consult Arbuthnot on the Nature of Aliments, 8vo. Lond. 1731; Fordyce on Digestion, 8vo. Lond. 1791; J. Abernethy on Local Diseases, including Derangements of the Digestive Organs; A. P. W. Philip on Indigestion, 4vo. Lond. 1826; J. A. Paris on Diet, Lond. 1827; J. Johnson on Morbid Sensibility of the Stomach, Lond. 1827. — ED.

and marvellously contradictory to each other. Some, looking with an evil eye on the refinements of society, would bring us back to the simplicity of savages, and have us live "according to nature." Though, when we ask, with the Prince Rasselas, what it is to live according to nature, we are sure to meet with no more satisfactory answer, than what was vouchsafed to that noble enquirer. The truth is, however, that our bodies would be as little bettered as our minds, by going back to the state of savages; for it is now ascertained that savages are universally short-lived, and subject to sudden and violent diseases. Population increases slowly amongst them, and the healthiest and strongest of them, if compared with the average of well-fed civilised Europeans, will be found inferior both in strength and health. Some theorists, again, would have us live solely on animal food, and assert, that the human viscera bear vegetables "only in a grumbling way;" while others would reduce us to the diet of Nebuchadnezzar, and not leave a flesh-pot in our kitchens. The different notions on dietetics by no means end here. Some sage doctors will never allow us to fill our stomachs, and some hold that they should never be altogether empty; some reduce the whole mystery of nutrition to a skilful exhibition of successive stimulants, and others to the exclusion of all that can interfere with the balsamic simplicity of the insipid chyle; some hold all fermented substances pernicious, and others think fermentation the best preparative for digestion. But, as the judicious critic, to whom we are indebted for the above reflections, has observed, how is it possible to say, what is absolutely the best diet for human beings, when we consider under what an infinite variety of different habits such beings are found to live in health and vigour, and by how many opposite causes their health and vigour are impaired? The same diet that is sanative to one, whose digestion has been weakened by scanty and penurious living, cannot possibly be suitable to another who has suffered from a long course of repletion and excess. The regimen that is most wholesome for youth is not likely to be well fitted for old age; nor can that, which answers for the active and laborious, be proper for the studious and sedentary. Nay, your dry and adust subject plainly requires a different regimen from that of the plump and succulent. A lover should not be dieted as a miser; nor a champion of the fancy like a prime singer at the opera. Every man differs from every other in some of the important attributes of age, habit of body, occupation, temperament, and disposition, to which may be added climate; so that all rules of diet must plainly require innumerable modifications to accommodate them to the condition of those classes of persons, even if it were possible to reduce them to certain classes. Besides all this, there are special and apparently capricious varieties of digestive power, which the learned called *idiosyncrasy*, by which the application even of those vague and variable rules must be constantly frustrated.* All directions, which are rational, must be founded on the circumstances of the individual to whom they are offered; and even then cannot be deemed valid, until they have been confirmed by his particular experience. However, the general instructions given by the author of this work, with reference to the diet of dyspeptic persons, may be considered as good and valuable.]

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

* See Edinb. Review, No. 93. p. 38.

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.
Tempera-
ture and
clothing.

Exercise in
extreme
weakness.

Friction
of the
stomach.

Dyspeptic
complaints
from
organic
disease.

Proper temperature and clothing are also subjects of some importance; but, as we shall have occasion to enlarge upon these, more particularly when treating of PHTHISIS, I shall only observe at present, that the feet and chest should be kept especially warm, and that all extremes of heat and cold should be sedulously avoided; a general glow on the surface, when produced by exercise, will be advantageous, but it should not be carried to the extent of much sensible perspiration, as this might terminate in a debilitating chill. And where the languor is so extreme as to prevent exercise abroad, that of a swing or rocking-horse may be had recourse to at home; or where these cannot be endured, that of general friction, in any of the multiplied forms now in use, and especially friction of the stomach and belly, may be often employed as an advantageous substitute. Every tender mother is well acquainted with the benefit of such an external stimulant to her infant; and when judiciously applied, it may often be rendered so to an adult in cases of great dyspeptic languor and weakness.

[In the valuable paper by Dr. Abercrombie on chronic inflammation and ulceration of the stomach are many judicious observations on dyspepsia. From the facts there related, it appears that the above dangerous affections of the stomach may exist with much diversity of symptoms. These may be severe, and indicative of serious disease, or they may be such as, without very great attention, are likely to be considered as merely dyspeptic. In one case of extensive malignant ulceration of the mucous coat of the stomach, which was under the care of Dr. Chambers, no nausea and sickness existed, and all the symptoms, such as tormina, tenesmus, and frequent discharge of small liquid bloody motions, seemed to indicate disease of the bowels; yet the latter parts were found after death very little affected.* There may be hardness in the region of the stomach, or nothing may be discoverable by the most attentive examination; and it is in fact extremely difficult to propose any rules, by which chronic inflammation of this organ can be distinguished in its earlier stages. It may be suspected, when there is either permanent uneasiness in the region of the stomach, or pain recurring with regularity after meals, and incapable of prevention by attention to diet; when there is tenderness on pressure, especially if the pain and tenderness be always referred to a particular spot of small extent, and distinctly defined; when, along with the symptoms, vomiting occurs at short periods after meals, and after food of the mildest quality; and when, without any urgent or defined symptoms, a patient, with affections of the stomach, becomes progressively weakened and emaciated, in a manner which his symptoms, if considered as merely dyspeptic, could not account for. As Dr. Abercrombie confesses, however, none of these symptoms can be depended upon; most or all of them may exist in connection with a state of the stomach which is merely dyspeptic; and, under a more serious form, they may end fatally, with every appearance of extensive disease, and yet no morbid change be discovered in the stomach or neighbouring parts. Yet he rightly urges the remembrance of the important practical truth, that symptoms, which at first sight appear to be merely dyspeptic, often

* Med. Gazette, vol. i. p. 63.

depend upon chronic inflammation of the stomach. When there are grounds for this suspicion, he thinks that, though general bleeding is seldom admissible, much benefit may result from topical bleeding, blisters, issues, antimonial ointment, food of the mildest kind and in very small quantity, and the avoidance of stimuli and bodily exertion.*

The foregoing observations derive much confirmation from the statements of Mr. Annesley.† In warm climates, he says, inflammation of the mucous membrane of the stomach is a very common form of disease; and it takes place to a greater or less extent in the advanced stages of dyspepsia, the dyspeptic symptoms being truly the effect of gastric inflammation.

Some highly interesting observations on this subject were published by Dr. Armstrong‡; and, if they be correct, a part of the difference in the symptoms, in different cases, may in some degree be explained by the chronic inflammation being sometimes situated in the serous, sometimes in the mucous membrane of the stomach; a topic, which will be further noticed in treating of gastritis. There is something forcibly striking in the expression of the countenance and colour of the skin in most organic diseases. Thus, in tubercular disease of the lungs and elsewhere, the cornea becomes more shining, and the conjunctiva more pearly and blanched than natural, with a softness and almost pensiveness of expression; while the face grows more and more sharp, and the skin acquires a much more delicate hue. In scirrhus, the expression is that of more or less solicitude, and the skin commonly has a sallow tint, like that of the pale yellowish willow; whereas in fungus the skin has neither the delicacy attendant on tubercle, nor the sallowness accompanying scirrhus; but it is often of a dull muddled white, almost resembling that of tallow, or putty. Some change about the face and skin will frequently lead the experienced eye at once to suspect deep visceral derangement. Without being led away by first impressions, however, the pathologist will be careful not to confound the ventricular disturbance and sallowish aspect of the sedentary and studious dyspeptic with any organic disease of the stomach; for, though in him the face be "sicklied o'er with the pale cast of thought," yet it is most frequently an indication merely of disorder which admits of cure, and, even if continued, may not at all shorten life.§]

GEN. V.
SPEC. VII.
Limosis
Dyspepsia.

* See Edinb. Med. and Surg. Journal, No. 78. p. 12.; also Pathological and Pract. Researches on Diseases of the Stomach, ed. 2. p. 17.

† Researches into the Causes, &c. of the Prevalent Diseases of India, vol. i. 1828. 4to.

‡ See Morbid Anat. of the Bowels, Liver, and Stomach, p. 42, &c. Lond. 1828.

§ Armstrong, op. cit., p. 68.

GENUS VI.

COLICA.

COLIC. BELLY-ACHE.

GRIPING PAIN IN THE BOWELS, CHIEFLY ABOUT THE NAVEL,
WITH VOMITING AND COSTIVENESS.

GEN. VI. THERE are various diseases to which this definition will apply; but which, nevertheless, differ from each other in several particulars. Sauvages' M. de Sauvages thought these particulars of so much importance as arrangement. to justify him in advancing each of these complaints to the rank of a distinct genus, under the names of gastrodynia, colica, rhachialgia, Cullen's and ileus. Dr. Cullen, however, judged differently and more correctly. He regarded their distinctions as of subordinate moment, and in their prominent symptoms traced so close a resemblance as to indicate their being a sort of natural tribe or family: and he has, consequently, simplified them into one genus under the name here adopted, of COLICA. In the ramifications of his species, however, he seems a little too diffuse, and he has unnecessarily, and somewhat capriciously, varied a few of the ordinary specific names, as those of ILEUS and RHACHIALGIA, which, for reasons assigned in the volume of Nosology, are here restored. In other respects, the present arrangement does not especially differ from Dr. Cullen's classification. The species, that seem fairly entitled to attention are the following:—

- | | |
|---------------------|---------------------------------------|
| 1. COLICA ILEUS. | ILEAC PASSION. |
| 2. ——— RHACHIALGIA. | COLIC OF POICTOU, OR PAINTER'S COLIC. |
| 3. ——— CIBARIA. | SURFEIT. |
| 4. ——— FLATULENTA. | WIND-COLIC. |
| 5. ——— CONSTIPATA. | CONSTIPATED COLIC. |
| 6. ——— CONSTRICTA. | CONSTRICTIVE COLIC. |

SPECIES I.

COLICA ILEUS.

ILEAC PASSION.

GRIPING PAIN, VOMITING, AND COSTIVENESS, ACCOMPANIED
WITH RETRACTION OF THE NAVEL, AND SPASMS OF THE
MUSCLES OF THE BELLY.

SPEC. I.
Name
whence
derived.

THE name of Ileus (ἰλεος or εἰλεος, for it was written both ways) is entitled to veneration, as it has descended to us from the earliest Greek writers, who thus denominated it, either from that introsus-

ception or convolution of the intestinal tube, which so often accompanies the disease, and which is the direct meaning of the term; or from the ileum, or small intestine, in which the disease is principally or most usually seated. Sauvages, and nearly all the continental writers, continue the term. Dr. Cullen has exchanged it for spasmodica, as an adjunct to colica: but from the comment to the Nosological Synopsis just referred to, it will be seen that he has gained nothing hereby, either in regard to precision or elegance.

The griping pain or belly-ache in this species is very acute, and the vomiting is accompanied with a discharge, not only of bile from the duodenum, but of stercoraceous matter from the large intestines, or of injections introduced into the rectum; forcing their way through the strong muscular valve of the colon, which we have already noticed as being formed by a natural prolapse of the ileum, for the purpose of preventing a regurgitation of the feces into this last intestine; and evidently proving a powerful inversion of the peristaltic action through the whole or nearly the whole length of the intestinal canal. While the obstinate costiveness, which attends at the same time, pretty clearly indicates a spasmodic constriction, though rarely producing a total occlusion, of that part of the canal where the pain is most violent, often, indeed, extending to other parts, and even to the bile-ducts. And in this last case, even where the feces are discharged by the mouth, they are untinged with bile, while all the symptoms of jaundice supervene.* The morbid action is, indeed, not unfrequently so violent as to excite inflammation over a considerable part of the intestine chiefly affected; and consequently to aggravate all the other symptoms.

And hence the disease is presented to us under the two following varieties:—

- | | | |
|---|----------------------|-------------------------------------|
| α | Fæcosa. | The vomiting accompanied with feces |
| | Stercoraceous colic. | or substances injected by the anus. |
| β | Inflammatoria. | Accompanied with symptoms of in- |
| | Inflammatory colic. | flammation.† |

The dissection of persons who have died of either of these varieties has shown us, in some cases at least, that one portion of the affected intestine, constricted and lessened in its diameter, has

* Bartholin. Hist. Anat. Cent. v. 62. Ephem. Nat. Cur. Dec. i. Ann. iv. v.

† In a pathological point of view, the disease resolves itself into three leading modifications, pointed out by that able physician, Dr. Abercrombie:—1. Simple ileus, without any previous disease. 2. Ileus, with previous disease of such a nature, that it acts by deranging the muscular power, without mechanical obstruction. 3. Ileus with mechanical obstruction. (See Pathol. and Pract. Researches on Diseases of the Stomach, &c. p. 112. ed. 2.) Colic may be distinguished from enteritis by the absence of fever, the pain being generally relieved by pressure, the aspect of the countenance, and the quiet soft pulse. However, in an advanced stage, inflammation may supervene. When the symptoms of colic arise from a hernia, the protrusion will generally lead to its detection. Many diseases, being accompanied by sympathetic vomiting, may be mistaken for colic. Renal or biliary calculi may excite such vomiting; but the former case is characterised by pain in the back, and along the groins to the testicle and thigh, and disorder of the urinary functions; and the latter by a disturbance of the functions of the liver, and pain in the situation of the gall ducts. Besides, in neither of these diseases, is there the same obstinate constipation as in colic. See Whiting and Tweedie, in Cyclop. of Practical Medicine, art. COLIC.

GEN. VI.
SPEC. I.
Colica
Ileus.

Vomiting
of feces.

Spasmodic
constriction
of the
bowels.

GEN. VI.
SPEC. I.
Colica
Ilius.

Introsus-
ception
often pro-
duced.

Vomiting
of feces and
introsus-
ception
accounted
for.

fallen into another portion below it, and thus produced what is called an INTROSUSCEPTION, or involution of its coats. The fact is not difficult to be accounted for; and it will readily explain the cause of the great torture which is often suffered under the influence of this grievous malady. In every case, in which the intestinal tube is weakened, there is a very copious extrication of air, producing in many instances a palpable distention of the parietes of the abdomen. In ileus, however, there is also, as we have already observed, in conjunction with this, a strong inversion of the peristaltic action operating from the rectum to the stomach, and forcing back whatever recrement or other materials are co-acervated in any part of the intestines. These, by intermixing with the elastic vapour of the intestinal tube, become very voluminous, and distend it to its utmost range wherever distention can be accomplished. In one or more parts, however, of its entire length, we have also seen that there is a violent spasmodic constriction, through which the distentive force cannot prevail, excepting perhaps by snatches, or during a remission of the spasm. The two powers are hence brought into immediate contact; and while the gut is in consequence rigidly contracted above, it is widened almost to bursting below; and, during the struggle which ensues, a part of the imprisoned contents of the expanded intestine is forced upwards, and the collapsed portion of the superior intestine at the same time slides downward at the point of the stricture.*

* It is admitted by Dr. Abercrombie, that, in a fatal case of ileus, we generally find one part of the intestine in the state of distention, and another part empty and collapsed, presenting nearly the form of a cord. However, he considers the doctrine of spasm in this subject entirely gratuitous. The collapsed state of a portion of the bowel, he regards as the natural state of healthy intestine, when empty. On the other hand, he adverts to several facts to prove, that a state of uniform distention, with lividity, may occur as a primary disease of the intestinal canal, without any appearance of obstruction, and without any part of it being in a contracted state. In ileus, the collapsed parts, he says, are commonly found in a healthy condition; the morbid appearances, whether inflammation, lividity, exudation, or gangrene, being almost entirely confined to the distended parts. According to Dr. Abercrombie's views, the causes of ileus are referrible to a primary diminution, or destruction, of the muscular power of a portion of the canal, and impediments to its action; the consequence of which is, that a part, at first healthy, becomes impaired. Under the effects of this interruption, primary destruction or diminution of the muscular power of a portion of the intestinal canal seems to take place from the poison of lead, and also in enteritis, where the bowel is distended, without any obstruction in the parts below. Interruption to the action of a portion of the canal, giving rise to distention, and consequent impaired action of the part above, is exemplified in hernia, contraction and adhesion of the intestine, accumulations of fecal or undigested matter in the bowels. However, Dr. Abercrombie admits, that, in some cases, there may be an irregular or morbid contraction of a portion of the canal, and that this may sometimes prove the first step in that chain of derangement of the harmonious action of the canal, which leads to an attack of ileus. At the same time, he regards the doctrine of spasm as in a great measure conjectural. (Op. cit., p. 149—151.) However, several good practitioners do not follow Dr. Abercrombie on this subject. Thus, Dr. Elliotson conceives that opium may frequently do good by alleviating the spasm. (Med. Gazette for 1832-3, p. 551.) The occasional vomiting of feculent matter in colic appears to indicate a reversed order of the peristaltic action of the intestines. Drs. Whiting and Tweedie observe, that, although Dr. Abercrombie calls in question the spasm of the muscular fibres of the intestines, he cannot be said to have proved this point; he has, however, made it clear, that, in many instances, where colic has been supposed to arise from spasmodic contraction of some part of the bowels, it ought to

In the midst of this spasmodic commotion there is also another extraordinary change, which has been sometimes found to take place in the relative positions of different parts of the intestinal tube. For from the urgency of the moving power that works upwards, the natural effect of the gravitating power that works downwards, and the looseness of the convoluted canal itself in many parts, and its tightness from adhesions in others, it has sometimes become twisted into nooses and knots; in which the portion forming an encircling cord or bridle has been drawn so tight as to produce strangulation, and render gangrene inevitable.* In one instance, indeed, the spasmodic action was so extreme, that the bridle not only produced strangulation and gangrene, but cut through all the coats of the intestine on the opposite side to the mesentery, and made an opening of about an inch in length.†

Generally speaking, however, there is more danger in the second variety than in the first: the symptoms, if not early opposed, are more rapid in their progress, and gangrene is produced in a shorter period of time. Yet when an active and well-discriminated course of treatment is pursued, the inflammation is very frequently subdued, and the patient escapes without further injury.

It is a singular fact, that though ileus is no uncommon result both of intusussception and inflammation, it sometimes takes place without either of them, or at least without intestinal pain or other manifest symptoms of inflammation or spasm; for which we have the authority of Stoll‡, Haller§, and Morgagni||. Even where inflammation exists, it is not difficult to distinguish the disease from enteritis, by the spasmodic contraction of the abdominal muscles that accompanies it, the diminution of pain which ensues upon pressing the abdomen¶, and the small degree of fever which is present, compared with that by which enteritis is usually characterised.

Both varieties of ileus are apt to run into each other, and the disease assumes the first or the second form from the patient's idiosyncrasy, the peculiar condition of the organs affected at the time of the onset, the temperament of the season, or some other adventitious circumstance. The causes, therefore, for the most part, are alike, and very numerous. The more common are, acrid,

GEN. VI.
SPEC. I.
Colica
Ileus.

Occasion-
ally
strangula-
tion and
gangrene.

Second va-
riety com-
monly more
dangerous
than the
first.

How dis-
tinguished
from en-
teritis.

Both varie-
ties apt to
run into
each other.

Causes.

have been referred to another cause. Cyclop. of Practical Medicine, art. COLIC.
— ED.

* Mém. de l'Acad. Royale, xxiii. par M. de la Peyronie. Also several cases in Abercrombie's Pathol. and Pract. Researches on Diseases of the Stomach, p. 119—125. 2d edit. — ED.

† Med. Observ., vol. iv.

‡ Ratio Medendi, viii. 129.

§ Comment. Nova, Gotting. viii. 1.

|| De Sedibus, &c. xxxv. 19. 21. 23. In one fatal case, noticed by Dr. Abercrombie, the only changes found on dissection were, a softened state of a part of the right lobe of the liver, and a great and uniform distension of the small intestine, without any appearance of inflammation. Op. cit., p. 113. ed. 2.
— ED.

¶ Some examples on record do not correspond to this account: thus, in one case, related by Dr. Abercrombie, the pain was increased by pressure at the very commencement of the attack, even before any inflammation can be supposed to have existed; and, after death, merely a superficial blush of vivid redness was noticed, without any appearance of exudation. See Pathol. and Practical Researches on Diseases of the Stomach, &c., p. 114. ed. 2.—ED.

GEN. VI.
SPEC. I.
Colica
Ileus.

cold, or indigestible esculents; cold beverages on a heated stomach; catching cold in the feet or abdomen; exposure to wet during the flow of the catamenia; unalimentary substances swallowed through bravado or by mistake, as knives, metallic money, or pieces of glass, plum, cherry or other fruit stones; an excessive flow of bile probably of bad quality; worms; drastic purgatives in an over-dose, as scammony, black hellebore, and colocynth; calculous or other balls congested in the intestines and obstructing their passage, as scybala, bezoards, biliary calculi, and indurated feces; violent passions, or other emotions of the mind, as extreme rage or terror; intromission, a diminished capacity of the intestinal canal from scirrhus or cancerous tumours, from internal hernia, from an ossification, callosity, stricture, or coalescence of its internal tunic, [or from the difficulty with which the contents of the bowels sometimes pass that portion of the canal, which lies near the situation of a previous artificial anus.*] It is also at times a consequence of transferred gout or rheumatism.

Medical
treatment.
Venesection how
far to be
employed.

In the treatment of ileac passion, whenever there is inflammation, or a decided tendency towards it, evidenced by shivering or a full pulse, blood should be taken freely, and even repeatedly, from the arm, whether the patient be of a strong, robust, or of a delicate and weakly constitution. It is a practice, indeed, recommended generally by many writers in the commencement of the disease, even where no inflammatory action exists, with a view of relaxing the spasmodic constriction: but, in these cases, it is not absolutely called for, and, where the habit is weakly, is likely to produce more harm than good.†

The two next points to be aimed at are, a removal of the griping or spasmodic pain; and a restoration of the intestines, from a state of inverted action, to their proper peristaltic motion; and hereby a resolution of the costiveness.

Humid
heat and
aperient
injections.

For the first, humid heat in the form of a warm bath, warm fomentations, and warm and copious clysters, afford a rational chance of success. The last should be rendered emollient by a solution of oils, and moderately loaded with purgatives, so that both intentions of cure may be carried forward at the same time. In combination with these, opium may also be tried, and various other narcotics; and especially the extract of hyoscyamus, which, in many instances, evinces an aperient as well as a narcotic power. [The introduction of tobacco smoke, or the infusion of the plant, into the rectum is frequently of service. Dr. Abercrombie regards the tobacco injection as the remedy of most general utility in all forms and stages of ileus: fifteen grains are to be infused for ten minutes in six ounces of boiling water; and an hour after the injection of this quantity, if no effect has been produced, twenty grains may be infused, and their power tried; and so on, until slight giddiness and

Narcotics.

* See case by Abercrombie, op. cit. p. 126. — Ed.

† Ileus sometimes terminates in inflammation: this is one important reason for bleeding, when not forbidden by the patient's age, or the state of his constitution. Besides this obvious fact, Dr. Abercrombie believes there is a modification of the disease, depending upon inflammation limited to the muscular coat; here also blood-letting seems to him an important remedy; and the fact is familiar to every practical man, that the relief is often so immediate, that there is no time to raise the patient out of bed, or scarcely to tie up the arm, before complete evacuation takes place. (Abercrombie, op. cit. p. 159.) The best modern physicians certainly seem to be more in favour of venesection than Dr. Good. — Ed.

muscular relaxation show, that the peculiar action of this narcotic is taking place. If the case should not now yield speedily, Dr. Abercrombie recommends the clyster to be repeated every hour, or every two hours. With this means he associates full doses of mild purgatives, such as aloes and hyoscyamus, every hour or two. Also, if the patient be of a full habit, the pulse be rising, and a fixed pain or tenderness be complained of in any part of the abdomen, Dr. Abercrombie has recourse to one or two bleedings.*] If the opium be employed in the form of a tincture, the dose should be from a hundred to a hundred and twenty drops in an injection of four ounces of warm olive oil. If hyoscyamus be had recourse to, we may safely use either the seeds or the extract: about four or five grains of the former, and ten of the latter, may be added to each injection. Clysters of a strong decoction of poppy heads have also frequently been found highly beneficial.† And to these should succeed the application of stimulants to the belly, as ammonia, or blisters. Sir John Pringle speaks highly of the latter, and not without reason; for, if made sufficiently large to be active, they often succeed, not only in quieting the spasm, but in obtaining evacuations, after injections, purgatives by the mouth, fomentations, and opiates have been tried without effect.

GEN. VI.
SPEC. I.
Colica
Ileus.

Local sti-
mulants.

Purgatives for the second intention, and combined with antispasmodics, should, in like manner, be attempted by the mouth: though the vomiting is sometimes so incessant that we can get little or nothing to stay on the stomach. But the attempt must be made, and steadily persevered in. Calomel, in free doses of about four grains to a dose, will usually be found the best aperient medicine. It occupies the smallest space, and, in the form of a pill, has the fairest chance of being retained. If repeatedly rejected, it must be combined with opium, which nevertheless has a tendency to retard its action; but as the opium may mitigate the spasm and diminish the pain, it will commonly be found a useful adjunct, and a grain or two of it may be given every six hours. Calomel, however, though sure, is slow in its operation; and should hence, where the stomach will bear it, be united with some other and brisker aperient. Of these the neutral salts seem to answer best: but if they cannot be retained, we must exchange them for tartrate of potassa; which is less likely to be thrown back. It is seldom that the drastic purgatives can be recommended; because, if they do not succeed, they are apt to excite inflammation where it does not exist, and to increase it where it does.‡

Purgatives.

Calomel:

united with
neutral
salts.

Drastics
unadvis-
able.

[One modification of ileus yields to a full dose of opium sooner

Opiates.

* Pathol. and Pract. Researches on Diseases of the Stomach, &c., p. 159. ed. 2.

— ED.

† Colic may arise from hardened feces in the rectum, and hence another reason, very properly insisted upon by Dr. Elliotson, for the invariable use of a clyster, who prefers one composed of three ounces of oil of turpentine, blended with a pint of gruel or other fluid. Sometimes the removal of indurated feces from the bowel with the handle of a spoon becomes necessary. See Lect. in Med. Gazette, for 1832-3, p. 551. — ED.

‡ Dr. Elliotson does not seem to be intimidated by this doctrine: for, after giving scruple doses of calomel, and finding that this medicine remains in the stomach, he prescribes a strong dose of castor or croton oil, and Epsom salts. In one severe case, he gave with success a drop of croton oil every hour or half hour, till the desired effect had been produced. Op. et vol. cit., p. 550. — ED.

GEN. VI.
SPEC. I.
Colica
Ileus.

than to any other treatment. Such case seems to Dr. Abercrombie to be chiefly characterised by paroxysms of violent tormina, and, if these are accompanied by frequency of pulse, and fixed pain, or tenderness, he deems a free bleeding, followed by an opiate, a successful practice. At the same time, he expresses a preference to the treatment with tobacco injections, as generally safer than the employment of opiates.*]

Emetics
commonly
injurious.

The relief, derived from the symptom of vomiting has led some practitioners to prescribe emetics; but the benefit hence obtained is very transient. I do not mean to say that they have never been serviceable; but they cannot be relied upon, except in special cases, and have oftentimes aggravated the spasm.

Rectum
may be
syringed
with warm
water.

Cold appli-
cations ex-
ternal and
internal.

Dr. Cullen, on the advice of De Haen, recommends a stream of warm water to be thrown forcibly and with a proper syringe into the rectum, so that it may play like water from an engine upon the constricted portion of the intestine; and declares that he has found this remedy to be one of the most effectual.† When the ordinary means, and particularly those of warm injections and the warm bath fail, some practitioners have been courageous enough to try cold applications both external and internal. Sir George Baker tells us, that a physician of credit informed him he had once prescribed the cold bath with success. And Citois affirms, that, in several species of colic, this was his constant practice, even in the midst of winter, and calls upon all his fellow-citizens to attest, that most of his patients thus treated had been restored to health.‡ Saccassani relates the case of a person instantly cured by drinking a large draught of cold water.§ Zacutus Lusitanus narrates the history of a patient, who speedily got well by being rolled in snow.|| But these are extreme instances; and, notwithstanding an occasional success, the practice is not to be depended upon. It will prove most effectual where the colic is accompanied with, or produced by, hysteria. While, on the contrary, where it has been occasioned by too violent doses of drastic purgatives, warm stimulants, as the oil of turpentine, and even brandy¶, have been taken with great advantage.

How far
antispas-
modics to
precede
purgatives.

Dr. Percival, Dr. Warren, and various other writers, upon their authority, advise that the antispasmodic plan, whether by the stomach or the rectum, or both, should take the lead, and the purgative plan follow. This will always be found the proper order in attacking the painters' colic: but we should lose much important time, and often allow the inflammatory symptoms to get fatally ahead, if we were to adopt this as a general rule in ileac passion; in which the symptoms, if not more dangerous, are more urgent, and demand a more rapid march of treatment. [After the explan-

* Pathol. and Pract. Researches on Diseases of the Stomach, &c., p. 160. ed. 2.

† In the Glasgow Medical Journal is a case, in which the inflation of the intestines with common air gave relief. — Ed.

‡ F. Citesii Opuscula Medica, p. 215. "When every thing has failed, I have known this affection of the bowels overcome by taking the patient out of bed, and dashing two or three pails of cold water upon the abdomen." (Professor Elliotson's Lectures, Med. Gaz., 1832-3, p. 551.) Dr. Abercrombie has repeatedly tried the method of raising the patient into a standing posture, and dashing cold water about his legs; but no benefit resulted from it. (Pathol. and Practical Researches on Diseases of the Stomach, &c., p. 160. ed. 2.) — Ed.

§ Epist. v. Haller, Bibl. Med. Pr., iii. p. 601.

|| Prax. Adm. lib. ii. obs. 23.

¶ Clossius, obs. 27.

ation given of the numerous and very different circumstances, exciting or accompanying ileus, it requires but a slight effort of the understanding to know that the treatment ought not to be conducted in any particular way in every example of the disorder. Hence, Dr. Abercrombie points out three varieties of ileus: one case, characterised by obstinate costiveness, distention of the abdomen, and considerable general uneasiness, but without tenderness, or much acute suffering. Another case, where the same symptoms are combined with fixed pain and tenderness, referred to a defined space on some part of the abdomen. A third case with violent attacks of tormina, occurring in paroxysms, like the strong impulse downwards from the action of a drastic purgative — the action proceeding to a certain point, there stopping, and becoming inverted, followed by vomiting, the vomiting often feculent. Dr. Abercrombie thinks that these distinctions seem to denote the propriety of differences of treatment, according as the symptoms may indicate a deficient action in the canal, or one in which there is violent action limited to a certain part of it, though ineffectual for overcoming a derangement which exists in a lower portion of the tube." The practical application of the distinction refers chiefly to the use of purgatives in ileus. "There are some cases," says Dr. Abercrombie, "which yield at first to a powerful purgative; and others, in which an active purgative is highly and decidedly injurious. A large dose of calomel will frequently settle the stomach, and move the bowels; but, upon the whole, I think the best practice, in general, is the repetition, at short intervals, of moderate doses of mild medicine, such as aloes combined with hyoscyamus. The peculiar and intricate character of the disease appears very remarkable from the fact, familiar to every practical man, that there are cases which yield to a full dose of opium, after the most active purgatives have been tried in vain."*]

GEN. VI.
SPEC. II.
Colica
Ileus.

SPECIES II.

COLICA RHACHIALGIA.

COLIC OF POICTOU. PAINTERS' COLIC. DEVONSHIRE COLIC.

THE PAIN AT FIRST DULL AND REMITTING: BUT PROGRESSIVELY GROWING MORE VIOLENT AND CONTINUED; EXTENDING TO THE BACK AND ARMS, AND AT LAST PRODUCING PARALYSIS.

FROM the pains striking through to the back, Astruc first distinguished this species by the name of RHACHIALGIA (*ῥαχιαλγία*), literally, "back-bone-ache, or spine-ache;" and as the term is highly expressive, and has been continued by most of the continental writers, it is retained as a specific name in the arrange-

GEN. VI.
SPEC. II.
Specific
name,
whence
derived.

* See Abercrombie's Pathological and Practical Researches on Diseases of the Stomach, &c., p. 158. ed. 2.

GEN. VI.
SPEC. II.
Colica
rhachialgia.
Description.

ment before us, notwithstanding that it has been dropped, or varied or exchanged for some other, by several writers of our own country.*

The pain is most commonly seated, from the beginning to the end of the attack, at the pit of the stomach. It is at first dull, but gradually grows more severe; and, as it increases, extends upwards to the arms, and downwards to the navel, back, loins, rectum, and bladder; and frequently to the thighs and legs. From the navel it sometimes shoots with so much violence to each side, that the patient feels, and so expresses himself, as if some person were cutting him in two. Almost all the external muscles are rendered sore by the great violence of the pain, as though they had been affected with rheumatism, and can scarcely bear the weight of the bedclothes or the slightest touch of a finger. Sometimes, however, the seat of pain alternates between the stomach, which nevertheless, as just observed, it never entirely quits, and the external muscles: it is violent in the stomach, while the lower bowels and the external muscles are at ease; or it nearly quits its hold on the stomach and lower bowels, and rages through the external muscles. Sickness is an early symptom, as well as costiveness; and as the pain in the stomach increases, the sickness increases also; even on the second day from the attack, the retchings are violent, and the discharge thrown up consists of acrid slime and porraceous bile. A momentary relief is hereby usually obtained, and the patient flatters himself that he is about to recover. Too soon, however, does he find himself disappointed: as long as the pain continues, the same morbid matter is secreted, and thrown into the stomach; and the retchings return with perhaps accumulated violence: or, if they do not, their place is supplied with bitter eructations and hiccoughs. The pulse, notwithstanding the severity of the sufferings, is little affected at first, and for several days continues as quiet as in health. After the fourth or fifth day, however, it sometimes becomes quicker, but not always: and it may admit of a question, whether the acceleration be not even at this period rather the effect of the medicines taken to procure relief, than of the disease itself.† [The skin, though generally cold and damp, is occasionally rather hot; but there appears to be no tendency to inflammation.] The urine varies so much in different individuals that no stress can be laid upon it. [In some cases, the sphincter muscles of the bladder and anus are so contracted, that the urine and feces cannot be voided, and a clyster-pipe is difficult of introduction.‡ Towards the close of the disease, there is generally a pain round the edges of the feet and at the extremities of the toes, which are often red, and swollen, and to appearance gouty. Relieving sweats break forth, sometimes accompanied with an efflorescence. About the same time, a griping of a different kind from what has hitherto been endured, and which is more easily bearable, takes place, attended with a disposition to go to stool;

* According to Dr. Monro, the pathognomonic symptoms of painters' colic are, the acute twisting pain about the navel, not increased by pressure; the dragging inwards and hard feel of the abdominal parietes; tenesmus; and obstinate costiveness. *Morb. Anat. of Human Gullet, &c.*, p. 246. — ED.

† Dr. Warren, *Med. Trans.*, vol. ii. p. 72.

‡ See Monro's *Morbid Anat. of the Human Gullet, &c.*, p. 246.

and after large discharges of various kinds of excrement, frequently of scybala or hard lumps, in shape resembling sheep's dung, together with black and dirt-coloured slime, occasionally mixed with blood, the patient is perfectly relieved. After several attacks of this disease, a paralysis commonly affects the fingers, or the whole hand and fore-arm, so that the former become contracted, and the hand, when the arm is extended horizontally, hangs at a right angle to the arm, the extensor muscles being in both cases more paralysed than the flexors. The palsied limb shrinks very much; and the muscles lose not only their natural size, but also their natural structure, being converted into a suety substance* or a soft pulp.†

Some writers represent the bowels as exhibiting after death a remarkable diminution in their diameter; some have met with invaginations; and others have found the bowels red and more or less injected. All these appearances seem, however, to be accidental, and not to constitute any essential part of the disease; for, in the first place, they may exist without being attended with symptoms of colic; and, in the second, persons die of the latter disease, and yet when their bodies are examined, no morbid appearances of the above description can be traced. M. Andral has published the details of several cases, in which no vestiges of disease could be detected in the alimentary canal after death, and similar facts are recorded by M. Louis. Neither could M. Andral find any defect in the brain and spinal marrow; and yet serious degrees of palsy had taken place.‡]

In a mild degree, and under the best therapeutic plan, the disease can seldom be removed in less than five or six days; but if it be violent, neglected, or ill-treated, it will continue for weeks, or even months, with now and then a truce for a few days; and will terminate in the above peculiar sort of palsy of the upper extremities; or in death, preceded by deafness, blindness, delirium, or epileptic fits.

The remote cause appears in almost every instance to be lead introduced into the system, either by the stomach, the lungs, or the skin; and hence the disease is found most frequently in those countries, and under those circumstances, in which this metal is most freely used or most readily dissolved. In the neighbourhood of smelting furnaces, pigs, poultry, and other animals evince the

GEN. VI.
SPEC. II.
Colica rhachialgia.

Paralytic
affection of
the upper
extremity.

Prognosis.

Lead the
common
remote
cause.

* See *Monro's Morbid Anat. of the Human Gullet, &c.*, p. 247.

† Dehaen gives a remarkable instance of a softening of the muscles in a person who was attacked by paralysis of the upper extremities, in consequence of colica rhachialgia. The muscles of the limbs, though capable of slight contraction, were converted into a substance as soft as pulp. After the removal of the paralysis, they recovered their usual consistence. Barthez mentions a case in which, under similar circumstances, the two deltoid muscles were softened in the same extraordinary degree; but returned to their natural condition after the paralysis had been cured. It is well known to pathologists, that, when the muscles of animal life have been long in a state of inactivity, they always grow pale, and lose their proper firmness. See *Andral, Anat. Pathol.*, t. i. p. 220. — Ed.

‡ See *Andral, Anat. Pathol.*, t. ii. p. 210. "If," says this distinguished pathologist, "there be one fact established in medicine, it is, that the lead colic is not an inflammation." He considers it to be a neurosis, in which the spinal marrow and abdominal plexus of the great sympathetic nerve are affected. He refers the constipation either to an annihilation of the contractile motion of the intestines, or a suspension of their mucous secretion. (*Clinique Méd.*, t. iv. p. 506.) — Ed.

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

Why called
Devonshire
colic, and
colic of
Poictou.

Hence
called also
painters'
colic.

same complaint. Thus, too, in Poictou and Devonshire, in which lead was formerly employed to destroy the acidity of the weak wines and ciders for which these provinces are celebrated, it was at one time so common as to obtain the name of Devonshire colic, and colic of Poictou. And hence house-painters, whose occupation leads them to a constant use of lead, and who are often too little attentive to personal cleanliness, are to the present hour so frequently affected by it, as to give it the still more general name of painters' colic. Plumbers, potters, glaziers, workers in glass, gilders, chemists, miners and printers, are, in like manner, exposed to its attack, from the large quantity of lead contained in the materials they are continually handling. I attended some years ago a printer, who had several times been afflicted with this disease, but had fortunately recovered from every attack, though each return proved severer than the preceding. The cause had never been suspected till I pointed it out to him, by enquiring whether, after leaving the printing-office, he was careful to wash his hands before he sat down to his meals; to which he replied, that he had never been put upon his guard on this subject, and had, therefore, never attended to it. I rigidly enforced upon him the necessity of doing so, and he continued for six or seven years without the slightest return. At this period he again grew careless and confident; he again suffered, and lost his life.

[The power of lead to excite colic and paralysis has been long known, these effects having been frequently traced to the accidental or designed use of the metal as medicine, or in the food and drink. During the sixteenth and seventeenth centuries, when preparations of lead used to be given in large doses medicinally, the colica pictonum and paralysis, in their severest forms, appear to have been very frequent. Nevertheless, it was not until the investigations of Sir George Baker were published, that the poison of lead was suspected even to be the common, much less the exclusive cause of colica pictonum. In countries where the disease was endemic, it was attributed to a free use of the sub-acid wines, or other acidulous liquors, peculiar to the respective districts with which, in fact, it was very obviously connected. In the West Indies, the endemic colic, called the dry belly-ache, is observed to be the consequence of drinking freely of newly distilled rum; and this liquor is therefore universally considered as the cause of the disease. Andral remarks, that an assemblage of symptoms, corresponding in every respect to colica pictonum, may arise from sudden and continual changes of temperature, as happens at Madrid; and also from causes which primarily affect the nervous system. "The origin of some other cases," he says, "baffles investigation. The positive reference of this form of colic in every instance to the action of lead, seems therefore not quite warranted."*

Lead, under some modification or another, is now considered to be the real cause of this species of colic. The cider of Devonshire produced the disorder much more frequently and extensively than that of other counties, as of Herefordshire; and the wines of some districts on the Continent excited the disease, when similar wines of other districts did not. Sir George Baker ascertained, that a small

* See Andral, Anat. Pathol., t. ii. p. 210; and a Memoir by M. Pascal, in Journ. de Méd., Militaire.

quantity of lead was employed in several of the mills, in which the apples were bruised for the manufacture of cider, to fasten the iron cranks which connected the stone-work. It is well known, too, that in several countries on the Continent, the practice of sweetening the wines with litharge, and other preparations of lead, was very common, and that, in these districts, the colic was particularly prevalent. Dr. Moseley was cautioned by Dr. Menghin, of Inspruck, to avoid all sweet wines whatsoever, but particularly the common tavern wines, upon the road in the Tyrol and in Italy. He never deviated from this advice but once, at Viterbo, and then he paid dearly for his indiscretion.* Colica pictonum is very prevalent in this metropolis and other large towns; yet Dr. Bateman never saw an instance which was not decidedly traced to the operation of lead. A great proportion of house-painters and plumbers, he observes, have the disease at some period of their lives; and, in particular constitutions, a very minute quantity of lead will bring it on. Dr. Fothergill has recorded several cases, in which it took place in persons who painted in water-colours, and were in the habit of pointing the pencil in their mouths. In addition to these facts, it deserves notice that, in many specimens of cider, which were analysed by Sir G. Baker, a small portion of lead was detected. And in the new rum of the West Indies, which excited the colic throughout several regiments, while others were totally free from it, Dr. Hunter discovered by analysis the presence of lead. After a time, the lead appears to be deposited, and then the rum loses its noxious quality.†]

The question was next started, and it has been started again in our own times, whether pure water, as well as acid wine, be not capable of dissolving lead in a metallic state; and, consequently, whether the community be not daily running a great risk of being poisoned by employing this metal in pumps and reservoirs? The public mind was for a long time agitated by this discussion, and Dr. Percival thought it right to institute a variety of nice experiments to allay the general apprehension, by showing that pure water is not in any respect a solvent of metallic lead.‡ Yet it was a course hardly necessary, since the daily use of lead in water cisterns, by upwards of a million of inhabitants in this metropolis, without any inconvenience whatever, was then, and still continues to be, the most decisive and satisfactory proof that can be afforded of the insolubility of metallic lead in rain or river water. Even saturnine lotions applied to the surface of the body have rarely, if ever, been found deleterious, although these also were at one time suspected of being highly mischievous. They may perhaps prove so in a few singular idiosyncrasies, but they do not affect mankind in general.

Lead, however, so minutely divided as to impregnate the atmosphere with its effluvium, has frequently laid a foundation for the disease. But whether any preparation under the form of cosmetics has proved injurious, I cannot undertake to say. The disease has certainly been produced by sleeping in newly-painted rooms, of

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

That lead
is a com-
mon cause,
established
by Sir G.
Baker.

Whether
pure water
will dis-
solve lead
in a metallic
state.

Whether
saturnine
lotions be
injurious.

Atmo-
sphere im-
pregnated
with lead
has pro-
duced the
disease.

* Treatise on Tropical Diseases, p. 527.

† See Med. Trans., vol. iii., and Med. Obs. and Inq., vol. v.; and art. COLICA, in Rees's Cyclopædia.

‡ Obs. and Exp. on the Poison of Lead, by T. Percival, M.D. 1767.

GEN. VI.
SEC. II.
Colica rhachialgia.

Illustrated
by a
striking
case.

Peculiar
effect on
some con-
stitutions.

Other
examples.

Water,
when
aërated,
capable of
dissolving
lead.

Hence
leadens re-
servoirs for
aërated
waters
should be
lined or
combined
with tin.

which a striking instance occurred a few years ago to myself. The patient was a surgeon of highly distinguished character in this metropolis. When I saw him, at his particular request, he had been ill for a fortnight; and, the cause not having been suspected, his complaint was conceived to be obscure and anomalous. The symptoms, as they struck me, were evidently those of rhachialgia from lead; and upon pointing out to him my view of the case, I found that, about a month antecedently, he had sent the whole of his family into the country, as his house was about to undergo a thorough repair in painting, while he himself remained at home, and slept there. The cause was admitted and acted upon, but the disease had gained too much ground, and was immoveable; his spirits became deeply dejected, and he fell a sacrifice in about two months from the attack.

In the Medico-Chirurgical Transactions is a case communicated by Dr. Badeley, in which the patient, a domestic in his own house, lost her speech and became paralytic from being only six hours in a newly-painted room, but quickly recovered from both upon being removed*; evidently proving the deleterious influence of lead in a state of vapour; and, at the same time, that, in different constitutions, it will show its effects upon different organs or in a different manner.

Sir George Baker asserts, that he has known the disease originate from minute corpuscles thrown off from the clothes which have been worn by plumbers while at work.† And in corroboration of this remark, Dr. Reynolds observed, when he was physician to St. Thomas's Hospital, that the colic of all the workers in lead frequently returned, under any management whatever, whilst they were allowed to wear the clothes in which they had been accustomed to labour: on which account such clothes were never suffered to lie on the patient's bed. Sentin was a witness of the same effect from hanging up labourers' wallets, filled with food for the day, in places impregnated with the vapours of lead.‡ And the present author has occasionally met with other instances of the disease from an habitual residence in close damp rooms, filled with *newly-printed* or *coloured* paper: for the emanation of flake-white, which usually enters into the colour, seems to have the same power of affecting or being affected by the surrounding atmosphere, as that of lead in a finely attenuated metallic state.§

I have said that pure water does not act upon lead in a metallic form: but while we see lead thus easily disintegrated, and reduced to an oxide or a carbonate by acids existing in the atmosphere, or even by the atmosphere itself, we may readily conceive that aërated waters are capable of decomposing it in a slight degree, and of forming oxides or salts that may be injurious to the health. And hence, where lead is required in the form of reservoirs for waters of this kind, or for culinary vessels, it should, by all means, be united with tin in equal proportions, as recommended by M. Prout||, or with a slight surplus of the latter, as proposed by M. Vauquelin.¶ For, first, tin is a harmless metal, as well in its salts and oxides as

* Vol. ix. p. 238. See also Seguin, *Annales de Chimie*, lxxxviii. 263.

† Essay concerning the Cause of the Endemic Colic in Devonshire. 1762.

‡ Memorab., p. 114.

§ *Med. Trans.*, vol. iii. p. 420.

|| *Annales de Chimie*, tom. lvii. p. 84.

¶ *Id.*, xxxii. p. 243.

in its reguline state, at least in any quantity in which we can conceive it possible to be swallowed by mistake. And, next, as it is more readily oxidable, and has a closer affinity for all the acids than lead, when united with the latter it must completely draw away all the acid it can come in contact with, and detach every atom of oxygen which might even previously have been united with the lead.

GEN. VI.
SPEC. II.
Colica rhachialgia.

The paralytic effect produced by the action of lead is one of the most formidable symptoms to be encountered in the therapeutic process: in laying down which, our first efforts should not be different from those in the preceding species, excepting that, in an attempt to remove the spasmodic pain, opiates may be allowed to precede the use of purgatives. [Colica rhachialgia is attended with obstinate costiveness, and, therefore, one would be inclined to have recourse at once to the most active purgatives. The best physicians have differed, however, respecting the propriety of beginning with cathartics. Sir George Baker directs purgatives; Dr. Darwin and Dr. Warren opiates.* Dr. Bateman was also satisfied that, whenever colic could be decidedly traced to the operation of lead, the most effectual treatment is the administration of a large dose of opium, and repeated at short intervals until the pain and spasmodic stricture are relieved, after which the bowels may in general be easily opened, and the cure completed by tonics and cordials.† One of the latest and best writers on the subject, Dr. Pemberton, has recommended a union of castor oil and laudanum. Dr. Cheyne has generally succeeded in relieving colica pictonum by following Sir George Baker's practice; yet occasionally he has found it necessary to give opium, and that too in large doses, particularly when obstinate vomiting occurred. Dr. Pemberton‡ states, that, in some examples, opium itself will act as a purgative, as he supposes, "by resolving the spasmodic affection of the colon, by which the feces are locked up between its circular bands." And one critical writer recommends a large dose of opium with the same view, as after its exhibition the difficulty of procuring stools, he says, is not great.§ With Dr. Cheyne, however, a doubt may be entertained, whether the costiveness be owing to spasm.|| "From the tormina we know that there is excitement in some part of the canal; from the vomiting we infer inverted peristaltic action; but from the obstruction we can infer no more than torpor of a particular part, and, judging from the symptoms which afterwards occur, this torpor would appear to be paralytic." This view of the state of the canal enables us, without the aid of spasm, as Dr. Cheyne conceives, to understand how benefit results from opium. His plan is, to administer purgatives in the slighter cases, and opium with purgatives and stimulating clysters in the

Medical
treatment.

Opium and
purgatives.

* Zoonomia, vol. ii., and Med. Trans., vol. ii.

† Art. COLICA, Rees's Cyclopædia.

‡ On Diseases of the Abdominal Viscera.

§ Edin. Med. and Surg. Journ., vol. iii. p. 72.

|| Dr. Cheyne's opinion on this point is corroborated by the statement of Professor Andral: — "The bowels," says he, "have been alleged to be strongly contracted in the lead colic, and their cavity much smaller than in the natural state; but my own observations enable me to declare, that nothing is more incorrect than this assertion." Anat. Pathol., t. ii. p. 119. — ED.

GEN. VI.
SPEC. II.
Colica rhachialgia.

Fomentations,
opiate
clysters,
venesection.

How far
the effects
of lead may
be opposed
by other
metals.

Mercury.

Silver.

Opium
highly
serviceable.

First
pointed out
by Dr.
Reynolds.

more severe ones.* Fomentations to the abdomen, the warm bath, and emollient injections containing laudanum, are useful means; and venesection†, if signs of inflammation of any of the abdominal viscera be present. In cases produced by the vapour of lead, Orfila says, the antiphlogistic treatment should be abandoned.‡] The paralytic effect has been attempted to be subdued by the counteraction of other metals introduced into the system for this purpose: and especially mercury and silver. Both have, indeed, been given from the commencement of the attack by many practitioners; and, as themselves relate, with great success. Dr. Warren and Dr. Biss were in the habit of persevering in the mercurial process till they obtained a salivation; and assert that they found the dull griping pain give way as soon as this was accomplished. The silver employed in rhachialgia has usually been in the form of its nitrate, or lunar caustic, to the amount of four or five grains in the course of the day. Dr. Roberts has published two cases of a cure obtained by this remedy; the one, that of a young, the other of an old man. The cases were both of considerable standing, and the joints of the wrists were weak almost to paralysis. Even this symptom, however, yielded by degrees. The salt was given from three to five grains at a dose three times a day in the form of pills: and in the last case five grains every six hours. It has the advantage of being a laxative as well as an antispasmodic: so much so, that a small quantity of opium was on this account added to the nitrate when given in its most frequent doses.§

In treating of passive hemorrhage, we shall have occasion to observe, that whatever deleterious property the acetate of lead may possess, it is entirely removed by a judicious mixture of opium with it, so as in this state of union to become a most valuable styptic. It is possible that, under the form of an acetate, lead may be less injurious than under some others, for it has not unfrequently been given alone in the same complaint without any rhachialgic pains where the bowels have been kept in a soluble state. But with opium every mischief seems effectually to be guarded against: and the beneficial influence of opium upon lead in this case should induce us to employ it, and that very freely, as an antidote in every case, and especially in the disease before us; and to counteract its constringency by a union with calomel. This rational practice, which has been pursued in our own country by several physicians, ever since Dr. Reynolds first called the attention of the profession to the corrective power of opium when combined with lead in the case of hemorrhage, has now for many years been also tried with success in various parts of the Continent. In France the dose of opium has been usually only a grain or a grain and a half every night; but in Spain, as we learn from the memoirs of the *Real Academia Medica de Madrid*, a much bolder and more

* Op. cit., vol. iv. p. 314. Dr. Elliotson does not particularly object to opium, provided it be briskly followed up by purgatives; yet, he thinks, that the latter answer equally well by themselves, without bringing on subsequent costiveness, which opium is likely to do. He begins with a large dose of calomel (one scruple), and then gives half an ounce of castor oil every two hours, until motions have been procured. — *Ed.*

† See Gregory's Elements of Physic, p. 513. 2d edit.

‡ Toxicologie, tom. i. p. 658.

§ Med. Trans., vol. v. art. v.

satisfactory employment of this medicine has been exhibited by a physician of distinguished judgment, Don Ignacio de Luzuriaga, who prescribed a grain of opium every three hours; and it will often be found necessary to augment this quantity.*

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

As the sulphate of lead is a compound insoluble in the stomach, and consequently altogether inert, M. Orfila ingeniously attempted to reduce the acetate and other preparations of this metal to the form of a sulphate, by giving large quantities of sulphate of magnesia; and he thinks he hereby succeeded in effecting a decomposition in the stomach of two dogs upon which he made experiments to ascertain this point; and in producing sulphate of lead in their stead. The experiments, however, proved fatal in both instances, though some portion of sulphate of lead seems to have been formed, and the death of the second dog to have been retarded. As the want of complete success may be ascribed to the want of a sufficiency of sulphuric acid in the re-agent employed, it would be better to try the experiment for the future by giving the purgative salt in infusion of roses, or any other liquid adequately charged with the acid to answer the purpose; or by a free exhibition of the acid in a diluted state alone.

Attempts
to reduce
the acetate
to a sul-
phate.

[Alum was at one time a popular remedy for painters' colic, but it has not maintained its ground; a fact rather against the efficacy of the sulphate of magnesia, as the merits of both depend upon the same chemical principle. Where, however, the colic arises from the presence of recently swallowed acetate of lead in the alimentary canal, and not from absorption by the skin, the method suggested by Orfila, with Dr. Good's improvement of it, seems the most promising of any of the plans hitherto recommended for counteracting the poison of lead. In confirmation of this observation, the editor begs leave to remind the reader of a statement made by Dr. Paris; namely, that he has found, in the treatment of hæmoptysis, the effects of the acetate of lead quite invalidated by combination with alum, or by being prescribed with acidulated infusion of roses, or with small doses of sulphate of magnesia.†]

The best purgatives, where the costiveness is severe, are those impregnated with the principle of camphor, as the essential oil of turpentine; and where these fail, the oil of croton in doses of one or two drops in the form of pills. [Dr. Elliotson sometimes has recourse to an injection of three ounces of oil of turpentine blended with fluid.

Oil of tur-
pentine :
of croton.

Two cases‡ of violent painters' colic soon yielded to the application of tobacco stupes to the abdomen, followed by the exhibition of cathartic pills, with croton oil, and of a purgative clyster. The introduction of tobacco smoke into the rectum is proper in obstinate cases, taking care not to continue it too long when the pulse and powers of the constitution begin to sink. Sydenham extols this practice in high terms. Injections of an infusion of tobacco are said to have been first recommended in this disease by Lentin.§

* Disertacion Medica sobre el Colico de Madrid, inserta in las Memorias de la Real Academia, &c. Madrid, 1796.

† See Pharmacol., vol. i. p. 338. 6th edit.

‡ Dr. Graves, in Dublin Hospital Reports, vol. iv. p. 45.

§ Memorabilia circa Aerem, vitæ genus, &c. Clausthaliensium. Gütting. 1779.

GEN. VI.
SPEC. II.
Colic rhachialgia.

Dashing of
cold water
on the
abdomen.
Bleeding.

Patients
liable to
subsequent
paroxysms.

Bath
waters.

When all usual plans prove unavailing, the bowels may sometimes be made to act by dashing cold water on the legs and belly.

Colica rhachialgia, besides being attended with perils arising from obstruction of the intestinal tube, has also another source of danger by the inflammation of the bowels, with which it may become joined. From being a spasmodic complaint, says Dr. Elliotson, or a paralytic one of the intestines (as others declare), it may become an enteritis. The symptoms are at first colic; the pain comes and goes; and there is no pyrexia; but, after a time, tenderness of the abdomen, fever, and all the marks of abdominal inflammation show themselves; and ultimately mortification. Hence the occasional necessity for leeches, and venesection; but, unless the obstruction be removed, antiphlogistic treatment will not avail.]

Those who have had this disease are liable for a long time to fresh paroxysms; and the slightest exposure to the same cause will be sure to reproduce it; yet the appearances in different persons, as well afterwards as during the attack, are extremely variable, from difference of idiosyncrasy: a correct idea of which may be best, perhaps, obtained from Dr. Warren's description of thirty-two domestics of the Duke of Newcastle's family, then residing at Hanover, who were all seized with rhachialgia after having used, as their common drink, a small white wine that had been adulterated with some of the oxides of lead. They were all attacked in the common way, except one, whose first assault was an epileptic fit. This patient, as soon as the pain in the bowels which succeeded to the fit had ceased, had his head again affected, was troubled with a St. Vitus's dance, and died epileptic in less than a fortnight. Three were feverish from the beginning to the end of the disease. The rest were without fever till the fourth or fifth day, their pulse becoming quicker as the pain began to abate. In some the mouth was made sore by the acrimony of the matter vomited up. Four fell into a salivation for several hours every day, and said that their pain was abated during the spitting. Many had profuse sweats, and a few an eruption of red and white pimples just before the disorder terminated. One was delirious during a part of the time, but recovered. All relapsed within four or five days after they seemed to be cured. Some relapsed several times for several years. One only was rendered permanently paralytic and costive.*

The most useful means of guarding against a paralytic diathesis, or of removing the paralytic sequel, where recourse can be had to them, are the Bath waters. And where the circumstances of the patient will not allow him to have the benefit of these, the spine may be advantageously rubbed night and morning with the warm balsams or resins dissolved in spirits†; and the common restorative process of air, exercise, friction, and tonic medicines should at the same

* Medical Transactions, vol. ii. p. 86.

† M. Ranque, principal physician of the Hôtel Dieu at Orleans, in a memoir on the colic of Poitou (in Archiv. de Méd., Paris, 1825), recommends counter-irritation on the abdomen, by means of a plaster containing camphor, theriaca, hemlock, tartarised antimony, &c. He rubs every painful part with a liniment, composed of the aqua-lauro cerasi, ʒij.; ether sulphuricum, ʒj.; and extract of belladonna ʒij. He also administers twenty drops of an ethereal tincture of the leaves of belladonna, and ʒiv. of olive or sweet almond oil, as a clyster. The loins are covered with a plaster, two thirds of which are extract of hemlock, and one third emplastrum plumbi. — Ed.

time he had recourse to, and persevered in for many weeks, or even months, without remission. [The continued use of aperients has great effect in preventing a relapse.* It is obvious, that the return of colica pictonum can never be effectually prevented, unless those avocations and beverages are relinquished, which exposed the patient to the influence of the poisonous metal by which the disease was excited. A painter should also leave off the clothes, in which he has been accustomed to work.

With respect to the paralytic affection of the hand and fingers, Dr. Pemberton found it much benefited by keeping these parts extended on a kind of hand-board, splint, or battledore. Blisters have also done good. M. Magendie recommends, for the removal of paralysis, the use of strychnine, which has been successfully tried by Dr. Graves.† It may be given, in the dose of $\frac{1}{10}$ of a grain, which may be increased to $\frac{1}{8}$, three times a day. In one case recorded by Dr. Elliotson, he tried this medicine and shocks of electricity; though he had seen benefit result from strychnine in other instances, the cure which followed in this example, is referred by him entirely to the electricity; first because the dose of the medicine was only increased to $\frac{1}{8}$ of a grain, and no catching and tingling of the parts occurred, which are well known to be the first effects of this powerful remedy. After the sudden discontinuance of it, the cure also proceeded as rapidly with the electricity alone as with both means united.‡ Electricity he regards as one of the best local applications. He advises it to be applied every day, not only to the hand, but the fore-arm, and thinks he has seen sparks answer better than shocks.]

GEN. VI.
SPEC. II.
Colica rha-
chialgia.

Avoidance
of exciting
cause.

Mechanical
support
of the
paralysed
hand.

Blisters.

Strychnine
and electri-
city.

SPECIES III.

COLICA CIBARIA.

SURFEIT.

THE PAIN ACCOMPANIED WITH NAUSEA, HEAD-ACHE, AND
DIZZINESS BEFORE VOMITING, AND AFTERWARDS TERMINAT-
ING IN A GRIPING LOOSENESS.

I HAVE already had occasion to remark, that the stomach is one of the most capricious organs of the entire system; and hence we often find persons in an unsuspected state of health complaining, that even the ordinary meal, to which they are accustomed, sits

GEN. VI.
SPEC. III.
Causes.

* Gregory's Elements, &c., p. 514. 2d edit.

† Dublin Hospital Reports, vol. iv. p. 46.

‡ See Clinical Lect. in Lancet for 1830-1, p. 333. But, notwithstanding the inference drawn from this particular case, in relation to strychnine, Dr. Elliotson makes a more favourable report of the effects of the medicine in other instances of this paralysis, where he tried it. "This is a species of paralysis," says he, "where I have exhibited strychnine with decided advantage." See Med. Gazette for 1832-3, p. 552.

GEN. VI.
SPEC. III.
Colica
cibaria.

Surcharge
of food.

Indigest-
ible husks
or kernels
of fruits.

Incongru-
ous food
in early
infancy.

The food
itself com-
bined with
some dele-
terious
principle.

Sometimes
narcotic
and acrid.

Symptoms
of the two
sometimes
combined.

upon it with a less degree of comfort and satisfaction than usual. And it is hence not at all to be wondered at that, when the stomach is overloaded with plain food, and still more with high-seasoned dishes and heady malt liquors and wines, the pain and sickness of colic should ensue, and that those organs, which are in closest sympathy with the stomach, and particularly the head, should participate in the affection.

The same effect is not unfrequently produced by swallowing the husks, stones, or kernels of fruit with the fruit that is eaten, all which the stomach may at the time, or perhaps at all times, be incapable of digesting, and some of which have in a few instances remained so long as to germinate before their rejection; examples of which are given in the author's volume on Nosology.

When the stomach of the new-born infant is filled with any other food than its mother's first flow of milk, which is purgative, and removes the viscid meconium with which the alimentary canal is gorged, tormenting pains of a like kind follow: and if much air be extricated, the infant is overpowered with flatulency; and the present species becomes connected with the ensuing, and exhibits the oppressive distinction of wind-colic.

These are the common causes of the species before us, which is characterised by a greater or less intensity of the symptoms enumerated in the definition. But we often find it also originating after meals from causes that are more obscure, and with various other symptoms of a still more violent and distressing nature, as though the food itself had proved poisonous, or some poisonous substance had been intermixed with it. These additional symptoms are of two kinds: in the one, we meet with an intolerable sense of suffocation, the throat constricted, the face and eyes swollen, inextinguishable thirst, a burning heat all over the body, a quick small pulse, an intolerable itching or pricking in the skin, and an efflorescence on the surface, sometimes in the form of minute red millet-seed papulæ, sometimes in that of weals; twitching of the tendons, and a peculiar kind of delirium; the cuticle peeling off on the subsidence of the attack: the whole evincing great malignity of action, as though the cause were of a septic nature. Under the other set of symptoms, in addition to those noticed in the definition, we meet with great anxiety and difficulty of breathing, dejection of the spirits, spasms in the limbs, as well as in the abdominal organs and muscles, tenesmus, coldness of the extremities, loss of sight and hearing, convulsions, or coma.

The symptoms, however, vary considerably according to the general nature of the constitution. For the most part, they are sufficiently distinct; but, in many persons, they are strangely united; and the lethargy, tenesmus, or coldness of the extremities, may be combined with the cutaneous eruption. And hence esculent colic may be justly contemplated as ramifying into the three following varieties:—

α Crapulosa.
Common surfeit.

The symptoms indicating an overloaded stomach, and usually ceasing on the evacuation of its contents.

β Efflorescens.
Eruptive surfeit.

The symptoms evincing the action of some noxious, deleterious principle; the skin covered with an efflorescence.

GEN. VI.
SPEC. III.
Colica
cibaria.

γ Comatosa.
Comatose surfeit.

The symptoms evincing great nervous irritation, with a rapid exhaustion of the sensibility.

In the FIRST OR SIMPLE FORM of the disease, the violence of the symptoms generally works its cure. But if the nausea should exist without vomiting, a simple emetic of ipecacuan should be given to excite the stomach to a more perfect inversion of its action, which should be followed the next morning by a brisk purgative. In the colic of new-born infants, from viscid meconium, the purgative alone will be sufficient, and the best medicine for this purpose is castor oil. If the congestion should proceed from an enfeebled state of the stomach, and too long a retention of the food in its cavity, it will be afterwards requisite to put the patient on a course of stomachic or general tonics, of which we have taken a sufficient survey in the preceding description of dyspepsy.

α C. cibaria
crapula-
losa.

Treatment.

It is possible, that the SECOND VARIETY may occasionally proceed from a morbid irritability of the stomach operating upon a tolerably full meal of the most bland and innocuous viands; but it more generally proceeds from *animal* foods of a particular description, or eaten under particular circumstances, as comatose surfeit does from poisonous *vegetables* intermixed with common food. The animal substances that chiefly operate in the manner above described, producing a dreadful feeling of suffocation, swelling of the face and eyes, intolerable thirst, a burning heat on the surface, pricking or itching on the skin, succeeded by an eruption of some kind or other, and accompanied with the specific symptoms of griping pain, vertigo, and vomiting—are shell fishes, and fishes of a few other kinds, as muscles, which are perhaps the most frequent of all causes, some species of scallops and other coarse ostraceous worms, the land-crab (*cancer ruricola*), lobster (*c. gammarus*), conger eel (*muræna major subolivacea* of La Cépède), gray-snapper (*coracinus fuscus major*), and yellow-billed sprat (*clupea Thryssæ* Lin.), the baracutá, the king-fish, and several other species or varieties of scomber, as the bottle-nose and ambar, the smooth bottle-fish (*ostracion glabellum*), and the rock-fish (*perca marina* of Catesby). There are also many others, but these are sufficient as specimens.

β C. cibaria
efflores-
cens.

Causes.

Deleterious
animal sub-
stances.

As all these are among the edible productions of the ocean, and hence are eaten very generally as nutritious foods, it is a question of great importance, and which is yet open to discussion, what are the circumstances in which they occasionally disagree with the stomach, and produce the above symptoms?

Under
what cir-
cumstances
they dis-
agree with
the sto-
mach.

It has been supposed by many pathologists, that the mischief is occasioned by some poisonous property being conveyed into the body of the fish in the form of food; by others, that it is the result of a change taking place in its general frame by the approach of the spawning season or some other period of life, or in consequence of its removal into a different climate; and by others again, that it

GEN. VI.
SPEC. III.
β C. cibaria
efflores-
cens.

Anatomical
and che-
mical exa-
mination of
poisonous
muscles.

depends altogether upon the idiosyncrasy or peculiar state of the constitution, or of the digestive organs of the persons that are thus affected.

[From an interesting paper by Dr. Combe of Leith, on the poisonous effects of muscles, we learn, that muscles which had produced such consequences, and had been taken from a wooden bar in the wet-dock, had no very positive mark, by which they could be distinguished from other muscles gathered elsewhere. His friend Dr. Coldstream was of opinion, however, that their livers were diseased, being darker and larger than natural. This disagrees with the investigations of Dr. Ferguson*, who arrived at the conclusion, that the deleterious effects are not connected with any organic change in the animal; but, as Dr. Combe has remarked, some change may happen in the structure or secretions of the animal, beyond the sphere of our detection. The animals were quite fresh, and had no peculiar smell nor taste. The most delicate chemical tests gave no indications of cupreous impregnation; nor could a comparative chemical analysis of the poisonous and healthy fish, undertaken by Dr. Christison, discover any peculiar principle in the former, or any difference in chemical nature between them. The poisonous effects of the muscles, gathered from the above wooden bar, were not confined to the human race, a cat and dog having also been killed by eating them, though other muscles, gathered in the vicinity of the dock, were eaten by such animals with impunity.† The supposition of a cupreous impregnation of the poisonous fish in the West Indies, has been ably refuted by Dr. Burrows.‡ The above particulars serve also to weaken the notion of putrefaction.]

Exotic poi-
sons intro-
duced into
the stomach
of fishes
that dis-
agree.

That many of the animals which prove thus noxious have derived their mischievous quality from some poisonous mineral, vegetable, or animalcule on which they have fed, seems probable from the well-known fact, that many of the most harmless and easily digestible species, if eaten without being disentrained, grievously disorder the stomach, and occasion many of the symptoms above noticed; while even the baracuta, which is ordinarily one of the most deleterious in its effects when eaten whole, becomes bland and innocuous to most persons when thoroughly cleaned, gutted, and salted. There is also, in many cases of the disorder hereby produced, a strong metallic and especially a coppery taste in the offending substance when rejected into the mouth, and which continues to affect the fauces for a long time afterwards; [though, as is above related, no copper can be detected in poisonous muscles.] M. Orfila has accurately noticed this last symptom in several of the cases he has enumerated; and especially in an example of this disorder originating in a mixed company of whites and blacks, who had fed on the conger eel, in the island of Grenada, in April, 1791. "The negroes," says he, "suffered more than the whites; they all experienced a coppery taste in the mouth, and a sensation in the œsophagus, as if it were excoriated."§

* Edin. Phil. Journ., vol. i.

† Dr. Graves on the poisonous effects of the muscle (*Mytilus edulis*), in Edin. Med. and Surg. Journ., No. 94. p. 86.

‡ London Med. Repository, vol. iii. p. 443.

§ Traité sur les Poisons, &c., tom. ii. sect. 1006.

It is in vain to urge, that what is thus poisonous to man, must have been at least as noxious to the animals that fed upon it: for poison is a relative term, and it is highly probable, that there is scarcely a vegetable or mineral substance but may be eaten, I do not say harmlessly, but even as a safe and nutritious food, by animals of some kind, however destructive to others. The land-crab is well known to feed on the manchineel tree (*hippomane mancinella*); the loxia or gross-beak of the Bahamas on the fruit of the *amyris toxifera*, or poison-ash; partridges on the leaves, and bees on the flowers of the *kalmia latifolia*, which are death to sheep, to horned cattle, and to man. So the *cicuta virosa*, or long-leaved water-hemlock, the most virulent plant that grows spontaneously in England, though fortunately not very common to our pastures, is fatal to cows, while sheep and horses eat it with impunity, and goats devour it with greediness; a fact well known, nearly two thousand years ago, to the first naturalist of ancient Rome, and thus fully described in his poem, De Rerum Naturâ:

— Videre licet pinguescere sæpe CICUTA

Barbigeras pecudes, homini quæ est acre venenum.*

On the contrary, while horses feed with avidity and thrive to fatness on the *agrestis arundinacea*, or reed bent-grass, Linnæus, as he tells us in his Travels in Shâne, found a number of goats perishing in an island in which this was the chief herbage.

This interesting subject is pursued with great spirit, and high advantage to the most important purposes of practical husbandry, in several articles published in the Swedish Amœnitates Academicæ; which give us tables of the best and most agreeable foods for cattle and other domestic animals, deduced from an exercise of that wonderful instinctive power of selection, which enables them to discern and to crop those that are a nutritious food for their own species, and to reject the rest. By one of these tables it appears, that, of four hundred and ninety-four species of indigenous plants of Sweden, three fourths of them common to our own country, which were offered to horned cattle, two hundred and seventy-six were eaten, and the rest refused; that goats, out of four hundred and forty-nine species, rejected a hundred and twenty-six; sheep, of three hundred and eighty-seven, would not touch a hundred and forty-one; horses turned away from two hundred and twelve out of two hundred and sixty-two: and swine, out of two hundred and forty-three, made choice of only seventy-two.† In another volume of the same interesting work, we have a like series of experiments on a great diversity of insects and worms, with a view of ascertaining how many of them are devoured or rejected by our common poultry‡; to which, however, I can only refer, and must leave the reader to consult it at his leisure.

It is hence perfectly clear, that no argument against the existence of esculents in the interior of animals, deleterious to the health of man, can be drawn from the position, that such esculents must also prove noxious to the animals that feed on them.

* Lib. v. 897.

† Vol. ii. art. 25. Pan Suevicus. Resp. N. L. Hesselgren. 1749.

‡ Vol. viii. art. 163. Esca avium domesticarum. Resp. P. Holmberger, 1774.

GEN. VI.
SPEC. III.
β C. cibaria
efflores-
cens.

Why not
injurious to
such fishes
themselves.

Subject
pursued
with great
spirit by
various
Swedish
physio-
logists.
Their gene-
ral result.

GEN. VI.
SPEC. III.
β C. cibaria
efflores-
cens.

Some fishes
deleterious
from season
or period
of life.

Examples.

The disease
often de-
pendent
upon idio-
syncrasy, or
a temporary
state of the
stomach.

Symptoms
produced
by poison-
ous mus-
cles.

Principles
of cure.

It is at the same time well known, that a considerable change takes place in the taste and nutritive qualities of many species of fishes, at various seasons and periods of life, by which they are divested of their nutritive power, and are rendered far less easily digestible; and which consequently lays a foundation for various affections of the stomach. This is particularly the case with the more luscious or oily kinds; as the herring, mackerel, eel, and salmon, all of which are unwholesome, if not pernicious, when out of season. We may also reasonably conclude, that climate has a considerable influence upon them, since the most pernicious species are those that exist in the intertropical seas.

It is, however, equally certain, that the disorder before us is, in many instances, rather dependent upon idiosyncrasy; or a peculiar condition of the stomach at the time, than upon any quality essentially noxious in the fish itself: for out of twelve or more persons dining together from the same diet, we often find only a single individual affected with the disease before us, while all the rest not only escape, but have made a nutritious and a healthy meal. Even in the same family, we occasionally meet with almost as many distinct idiosyncrasies in this respect as there are individuals. Of three sisters, M. Orfila tells us, that one was incapable of eating muscles, at any time, without great disorder of the system at large, as well as of the stomach; that the second experienced a like effect from herrings; and the third, from feeding on strawberries. And hence many pathologists have been induced to ascribe every case of colic, from the variety of surfeit before us, to idiosyncrasy alone. But the frequent examples we meet with of the affection extending through every individual of a large party that has fed on the same food, forbid us to limit our ascription of the disease to this single cause. [The symptoms, caused by poisonous muscles, are carefully detailed by Dr. Combe. In general, an hour or two elapses before any ill consequences are felt; and then the bad effects consist rather in uneasy feelings and debility, than in any complaint about the stomach. In two or three hours, however, a slight tension of the epigastrium is complained of. Cardialgia, nausea, and vomiting, occasionally take place, but not generally, nor for any considerable time. A prickly feeling in the hands; heat and constriction of the mouth and fauces: some difficulty of speaking and swallowing; numbness about the mouth, gradually extending to the arms; and great debility of the lower limbs; are the ordinary symptoms. Some patients have a bad or coppery taste in the mouth. In the abdomen, a slight pain is experienced, which is increased by pressure, particularly in the region of the bladder, the functions of which are variously disturbed. In some patients, the secretion of urine is suspended; in others, it is free, but passed with pain and effort. The action of the heart is feeble; the breathing unaffected; the countenance pale and anxious; the skin cold; the mental faculties unimpaired.*]

The principles of cure are of easier comprehension than the etiology. The peccant matter must first be discharged from the stomach by an emetic of rapid action, as about half a scruple of

* Dr. Combe, in Edin. Med. and Surg. Journ., No. 94. p. 89.

white vitriol; shortly after which, the lower belly should be stimulated to a like discharge, so that as little of the material as possible that disagrees with the digestive organs may remain in them. The history of the symptoms shows us, that the living power is rapidly, prodigiously, and sometimes alarmingly exhausted; whence indeed, in many cases, the tremors, sense of suffocation, faintness, sinking of the pulse, and general depression of strength; as also the swellings that take place through every organ where the cellular substance exists in considerable abundance. It is hence highly important to rouse the system with all speed, by means of the most diffusible stimulants, and warmest cordials and tonics, which may be commenced as soon as the stomach has been evacuated; the most useful of which are sulphuric ether, nitrous ether, ammonia, capsicum, and vinegar diluted with water, sweetened and drunk in abundance. The acids obtained by fermentation answer better in this case than any others, because they possess more of an alcoholic principle. And it is truly striking to notice the almost miraculous power, which is sometimes exhibited by this cordial plan of attack. Upon the administration of a single strong dose of ether, the patient, apparently in the act of expiring, has in various cases felt all his symptoms vanish in a very few minutes as by enchantment*; the pains have ceased; the absorbents, and indeed every other set of organs, recovered their wonted energy; the general intumescence has subsided, and the nettle or other rash disappeared. If, however, the system have been shaken more deeply, and the symptoms do not yield with much readiness, the tonic plan must be persevered in for many days or even weeks.

The THIRD VARIETY is usually produced by pernicious vegetables, instead of animals, that have been taken for food, or along with food; or esculent vegetables that disagree with the stomach, as in the preceding variety, from a morbid state of this organ, or from a peculiarity of constitution. I have already observed, that the symptoms in this modification of the disease evince great nervous irritation with a rapid exhaustion of the sensibility. There is severe spasmodic pain in the intestinal canal, with cramp, spasms, or convulsions, extending over the system more or less generally; accompanied with or succeeded by a lethargic drowsiness, from which it is often difficult to rouse the patient; and from which, also, when roused, he instantly relapses into convulsive agitations; evidently proving that an acrid and a narcotic principle are combined in the unsuspected cause. This cause is usually mushrooms; or rather deleterious fungi that have been mistaken for the genuine edible mushroom, or *agaricus esculentus*. The agaric is so extensive a genus, and many of its species to an unpractised eye have so near a resemblance to each other, that it cannot be wondered at that such a mistake has been committed: though perhaps the plants that, through such an error, have been most frequently gathered, are, the bulbous agaric, the Medusa's head, the raven's eye, the hemlock mushroom, and the *agaricus muscarius*. It is possible, indeed, that even the genuine mushroom itself may prove deleterious to some idiosyncrasies, or to some stomachs in a morbid

GEN. VI.
SPEC. III.
β C. cibaria
efflores-
cens.
Emetics
and ca-
thartics.

Diffusible
stimulants
and cordial
tonics.

Their rapid
benefit in
some cases.

γ C. cibaria
comatosa.

Commonly
from
noxious
vegetables.
Symptoms.

Fungi the
most com-
mon cause.

Sometimes
the edible
mushroom
itself a
cause.

* Orfila, tom. iv. sect. 1005. Dulong, Gazette de Santé, Oct. 1. 1812.

GEN. VI.
SPEC. III.
γ C. cibaria
comatosa.

Cautions in
gathering
mush-
rooms.

Other vege-
tables than
fungous
plants.

Dishes
cooked in
copper
vessels.

Medical
treatment.

state of constitution; but then the mischief is in almost every instance confined to an individual alone, the rest of the company eating of the same dish with satisfaction and pleasure.

As there is no critical mark to determine at once between poisonous and salutary mushrooms, we may lay it down as a general rule, that those should be suspected and avoided that grow in moist and marshy grounds, and especially in the shade; that have a dirty-looking surface, and whose gills are soft, moist, and porous. For the most part the smell of these is virulent, and they are covered with a calyptræ or veil.

There are, however, a considerable number of other vegetables that produce a like effect when taken by accident for food, or along with food; as the *cicuta virosa*, or water hemlock, the leaves of which have been mistaken for smallage, and the tap-roots for parsneps; the *cethusa cynapium*, or fool's parsley, which has been culled for common parsley; and the *secale cornutum*, or spurred rye. The last is productive of very serious evils in different forms, and we shall hence have occasion to return to it when describing erythematic pestis, and mildew-mortification, both which also result from its use. Rye becomes spurred or horned in the shape of its ear, apparently from having numerous punctures made by different insects in the fresh pullulating grains of the glume as a nidus for their minute eggs, in the same manner as the nut-weevil (*curculio nucis*) pierces the young and tender nut of the hazel for the same purpose. And as the effects, produced by the grain thus diseased, are very different in different seasons or climates, we have reason to believe, that its juices are themselves rendered noxious in a different manner, according to the species of insect that makes the attack. It is also said that the common garden rue (*ruta graveolens*), when eaten to excess, is succeeded by the same symptoms of ventricular pains, spasmodic action and coma, though in a less degree; but I have never seen such consequences, and have reason to think that they have been overrated.

Most of these symptoms are also produced by feeding on soups, or other dishes, that have been cooked in copper vessels containing verdigris. We have the same violent gripings and muscular commotions, excited by the acid quality of the plant just noticed, and in almost all instances headach and confusion of intellect, and sometimes coma. In all these cases, however, we can easily detect the nature of the poison, by the intolerable coppery taste of the mouth, and the green or greenish-yellow colour of the matter rejected from the stomach.

The cure, as in the preceding variety, must be promoted by evacuating, in the first instance, the poisonous principle, as largely as possible, from the stomach. Where the local irritation is great, demulcent mucilages should succeed: or soap where the effect has been produced by salts of copper. After which, if there be much general convulsion or other irritation of the nervous system, it must be allayed by opiates.

SPECIES IV.

COLICA FLATULENTA.

WIND-COLIC.

PAIN ACUTE, EXTENDING TO THE PIT OF THE STOMACH, OFTEN IMPEDING RESPIRATION; ACCOMPANIED WITH GREAT FULNESS AND FLATULENCY; AND RELIEVED BY PRESSURE, BENDING THE BODY FORWARD, OR EXPULSION OF WIND.

THIS species is produced by crude and flatulent fruits, and whatever lowers the tone of the alimentary canal; as too long fasting, fear, or grief, and all the causes of dyspepsy, with which it is often complicated, and to which the reader may turn. Like dyspepsy, indeed, it seems to depend upon local debility, whose seat is in the small intestines, and consequently in the direct neighbourhood of the stomach. It is often accompanied with great costiveness, from the spasmodic action, which runs, in a larger or less degree, through the whole of the intestinal canal, and considerably adds to the torture, and increases the tumefaction and tenseness of the abdomen; which are sometimes so extensive as to resemble *emphysema abdominis*, or tympany.

The last symptom is peculiarly striking and oppressive in persons of an hysteric diathesis, who are attacked with this complaint from very slight causes; and in whom it is often combined with syncope or clonic spasms of various kinds.

In attending to the means of cure, we may here proceed at once with some degree of boldness; since, notwithstanding the violence of the pain, it is not often that inflammation is to be apprehended, at least in the commencement of the disease: and hence the warmest carminatives, and even alcohol, may be had recourse to; for whatever will carry off the flatulency, will carry off the pain and costiveness. Hence a spoonful of brandy, or, which is better, a dose of tincture of rhubarb, ammonia, infusions of herbs containing essential oils, as mint, peppermint, penny-royal, are generally consoling and salutary. For the same reason, the aromatic spices may be had recourse to with success, and particularly in connection with opiates. Of the spices, the nutmeg, on account of its greater volatility than most others, and especially on account of its established reputation for producing quietism and even sleep, has a peculiar claim to attention.

The only disadvantage of opium is, that it has a tendency to diminish the intestinal, and indeed all the secretions, excepting that of sweat: and, on this account, it has been objected to by many physicians; but, from its power of allaying spasmodic irritation, and consequently of producing ease, it becomes of so much importance, that it ought unquestionably to be called into use: and there are cases in which, from this very power alone, it may indirectly act the part of an aperient. The opiate confection, as

GEN. VI.
SPEC. IV.
Causes.

Medical
treatment.

Opium
how far
useful.

GEN. VI. combining an aromatic with a narcotic principle, is a highly valuable
SPEC. V. as well as an elegant preparation. And after the pain has subsided,
Colica flatulenta. an active purgative, according to the course recommended by Dr. Cullen*, may be administered.

Opium may also be given in the form of an injection, which should not exceed five or six ounces, for otherwise it will probably be thrown back. It will be often of great use to unite with the narcotic a pretty free dose of turpentine, or some of the warmer balsams, especially that of copaiba; and to apply rubefacients to the epigastric region.

The convalescent treatment may be the same as already recommended under dyspepsia.

SPECIES V.

COLICA CONSTIPATA.

CONSTIPATIVE COLIC.

THE GRIPING PAIN SEVERE; THE COSTIVENESS OBSTINATE; GREAT TENSION, WITH LITTLE FLATULENCY: THE VOMITING SOMETIMES ACCOMPANIED WITH FECES; THE COSTIVENESS WITH BLOODY STRAININGS; TERMINATING, WHERE NOT FATAL, IN A FREE DEJECTION OF THE INFARCTED MATTER.

GEN. VI. THE pain is here produced by indurated meconium, or feces,
SPEC. V. or other intestinal concretions, and especially those which are known by the name of bezoards, and will be hereafter described under the genus ENTEROLITHUS: and we hence obtain the following varieties:—

- | | |
|----------------------------|--------------------------|
| α Meconialis. | From viscid meconium. |
| Colic of new-born infants. | |
| β Fæcosa. | From indurated feces. |
| Stercoraceous colic. | |
| γ Enterolithica. | From bezoards, and other |
| Stony colic. | intestinal concretions. |

First two varieties dependent on the state or action of the intestinal absorbents.

The first two of these varieties are the result of a superabundant action of the intestinal absorbents, or of a deficiency in the peristaltic power of the intestinal tube; in consequence of which, from the length of time the confined materials occupy in completing their descent, the meconium in infants becomes so viscid as not to be urged downwards, and remains in the intestines till it grows acrid; and the feces of later life, exhausted of moisture, hardened into one solid mass, possessing the figure of the intestine, or, separating into smaller pieces, appear, when discharged, in the shape of balls or buttons, often as hard as sun-burnt clay, and have been called, though not quite accurately, scybala; yet sometimes they make a

near approach to this substance, and consist of masses of indurated feces, combined with a certain portion of mucus or oleaginous matter secreted into the intestines, and producing a cetaceous or soapy feel.

Of the stony variety, the following is an extraordinary example related by Dr. König, of Berne.* A young woman of twenty-five years of age, by name Margaret Lawer, after an anomalous and general disorder, discharged continually the contents of the intestines, and even the clysters that were injected, by the mouth, and at length a number of stones as hard as flint, some in fragments, some of the size of peas, others of that of filberts. A clashing of stones against each other was felt by pressing the hand upon the abdomen: there was great constipation, severe gripings, and dysury; and the urine, when voided, was often loaded with a gravelly matter. The aliment and injections being constantly returned by the mouth, Dr. König desisted for four months from offering her either meat, drink, or medicine of any kind, excepting occasionally a spoonful of oil of almonds. Blood was now and then vomited, from the violence of the spasmodic affection of the stomach; and frequently urine to the amount of three or four ounces at a time, of a strong taste and smell. The disease seems to have lasted, with remissions, from January, 1681, to February, 1683, at which period the history is abruptly dropped, though the patient seems to have been in a state of recovery. It was preceded by the appearance of vesicular eruptions on the skin. The chemical examination of the calculi is loose and unsatisfactory.

The oleaginous purgatives, soap injections, and mucilaginous diluents, to diminish the irritation of the intestinal absorbents, will here be found most successful. Small doses of neutral salts, sulphur, and acidulated drinks, may also be of service in promoting the latter intention. If the griping be severe and the case urgent, terebinthinate injections, in the last two varieties, will also be highly expedient, and not unfrequently produce speedy relief. In these cases, the injections should be copious, so that the fluid may readily insinuate itself between the imprisoned matter and the coats of the intestines: and the turpentine should not be less than from half an ounce to an ounce, diligently triturated with yolk of egg, so as to be perfectly diffused and suspended in the menstruum. "Thus prepared, we have found it," says Dr. Cullen, "to be one of the most certain laxatives that can be employed in colics and other cases of obstinate costiveness."†

GEN. VI.
SPEC. V.
Colica constipata.

Example
of third
variety.

Process
of cure.

* Phil. Trans., year 1686.

† Mat. Med., vol. iii. p. 181. Every man of experience is aware, that, when a man takes chalk mixture, or magnesia, in considerable quantities, intestinal concretions are liable to be formed, unless the bowels be well cleared out occasionally with a brisk purgative. The carbonate of iron will sometimes accumulate in the bowels in large masses, creating obstruction. Dr. Elliotson has known collections of it take place in the rectum. He had a patient labouring under tetanus, to whom he gave this remedy with success; but, when purgatives were not given, there was pain in the rectum, and it was necessary to pick the iron out of it: a shovelful was found in his bed. (See Med. Gazette for 1832-3, p. 598. — Ed.

SPECIES VI.

COLICA CONSTRICTA.

CONSTRICTIVE COLIC.

A SENSE OF STRICTURE IN SOME PART OF THE INTESTINAL CANAL; OFTEN OF FLATULENCY, GRADUALLY PASSING OFF BY THE STRICTURE; THE BOWELS TARDY; DISCHARGING WITH DIFFICULTY SMALL LIQUID STOOLS.

GEN. VI.
SPEC. VI.
How distinguished from *proctica callosa*.

THIS species bears a near approach to *proctica callosa*, or the callos contraction of the rectum; which last, however, as accompanied with less griping and flatulency, and consequently having less of the character of colic, and more particularly from its being in most cases within the reach of manual examination and surgical aid, and capable of assistance by a different mode of treatment, is entitled to a distinct consideration.

Symptoms.

[Stricture of the intestines, in the early stage of the disease, gives rise to colic pains, and costiveness, alternating with bilious diarrhœa. After some time, solid feces are very rarely passed, and only after a great effort; and they are of an extremely slender calibre.]

Proximate cause.

The proximate cause of the disease before us is a permanent stricture existing in some part of the intestinal canal beyond the reach of the finger, from callosity, scirrhusity, a ring of tubercles or caruncles, or whatever else has a tendency to thicken its coats and diminish its diameter. [Strictures are more frequently met with in the colon and rectum, than in the small intestines: and Dr. Monro has seen the natural diameter of the colon so much reduced, that an ordinary quill would hardly pass the constriction. When the stricture is great, the bowel is generally enlarged above it*, and even ulcerated. Sometimes, indeed, it gives way; its contents are effused; and the patient, after labouring under colic for a few hours, is suddenly seized with very acute pain in the abdomen, rapidly followed by a sudden sinking of the pulse, cold sweats, and death.† When scirrhus affects the bowels, the diseased portion of them is always rendered narrower, and sometimes nearly impervious. According to Meckel, the disease begins in the peritoneal coat and glandulæ muciparæ, whence it afterwards extends to the muscular and villous coats. The effect of it is to confound together all the tunics, to thicken and harden them, and, in the end, to produce cancerous ulceration.‡ The muscular coat is also subdivided by membranous septa, and the internal one sometimes projects in the form of hard irregular folds. In persons of advanced age, scirrhus of the large intestines is not uncommon, and it mostly attacks the sigmoid flexure of the colon, or the rectum. The reason of this fact is referred by Dr. Baillie partly to the villous coat of the lower end of the great intestines containing many glands, and partly to the sig-

* Baillie's Works, by Wardrop, vol. ii. p. 158.

† Morbid Anatomy of the Human Gullet, &c., p. 301, 302.

‡ Bourdon, Revue Méd., Mai, 1824, and Meckel, Manuel d'Anat., t. iii. p. 448.

moid flexure of the colon being naturally its narrowest part, and most liable to be irritated by the passage of hard substances. But, though strictures are most frequent in the colon and rectum, they are sometimes met with in the small intestines. In the Museum of the University of Edinburgh is a specimen of a stricture, extending seven inches along the ileum.*

GEN. VI.
SPEC. VI.
Colica con-
stricta.

Besides the foregoing scirrhus disease, by which the intestinal tube may be obstructed, there are other morbid alterations by which the same consequence may be produced. One is an elevation of the mucous membrane into thickened folds by an accumulation of the cellular membrane.† Another is a thickening of the mucous or villous coat alone, coagulable lymph being effused upon it. In the collection of Mr. A. Burns is a specimen, taken from a child, where a gelatinous substance, mixed with coagulable lymph, adhered very intimately to the villous coat of the sigmoid flexure of the colon and the rectum; and above the sigmoid flexure, the intestine had given way. In some instances, the intestine is completely filled with coagulable lymph, which may either be voided by stool, or remain and prove the cause of death.‡ The intestinal canal, and particularly the colon and rectum, are sometimes the seat of polypi, or of various other excrescences, some of which are hard and solid; others, spongy, loose, and soft.§ One is termed milky by Professor Munro, and has a very fetid smell: Meckel expresses a conviction that the disease here alluded to is in reality fungus hæmatodes: but such a case is rare, and has never been seen by Mr. Wardrop.||

The colon and rectum, highly sensible in a state of health, are peculiarly irritable from the diseased action, and the specific symptoms are the consequence of irritation produced by the mechanical pressure of the feces; and often by acrimony from their retention. In most cases, the stricture lies beyond the reach of topical applications. Purgatives afford but temporary relief.¶ Of late, the conium has been chiefly trusted to, in conjunction with the mercurial pill. But, I am not aware, that these have proved decidedly advantageous. The spasmodic attacks must be encountered by the remedies already recommended in spasmodic and flatulent colic: and the habitual uneasiness, felt in the intervals, will be best alleviated by a rigid attention to a light, liquid, and aperient diet. Unfrequent as this disease is in general practice, I happen to have at this time two patients labouring under it: one a lady of about thirty-five years of age, who has been subject to it for ten years, and is incapable of passing feces more voluminous than those of an infant; and the other a man, forty-nine years old, who has laboured under the disease for twenty-one years, and can never pass a motion larger than a crow-quill. Yet, by strict attention to diet, both are able to exist with only occasional inconvenience and pain; the last married about two years since, and his wife has lately brought him twins. He lives upon liquids altogether.

Remedial
process.

[As the sigmoid flexure of the colon, near its termination in the rectum**, is frequently the seat of the disease, this part should be

* *Monro, op. cit., p. 301.*

† *Baillie's Works, vol. ii. p. 159.*

‡ *Monro's Morbid Anatomy, &c., p. 119—122.*

§ *Meckel, op. cit., p. 444.*

|| *Baillie's Works, vol. ii. p. 161.*

¶ *Monro's Morbid Anatomy of the Human Gullet, &c., p. 302.*

** See Mr. Penkivil's case, in *Edin. Med. and Surg. Journal*, No. 72.

GEN. VI.
SPEC. VI.
Colica con-
stricta.

carefully examined in every case of total obstruction of the bowels, not arising from hernia. It is requisite for the purpose, says Dr. Willan, to employ a bougie thirteen inches long, and of a proportionate strength. He adds, "I lately saw a lady thus relieved, who had been twenty-six days without any evacuation from the bowels, and who seemed nearly exhausted by violence of pain and distention of the abdomen, hiccough, cold sweat, &c. It is remarkable how long patients subsist under these distressing circumstances. In one instance, the time was twenty-nine days; in another, thirty-three days. As the latter patient recovered, after enduring every torture such a disorder could inflict, practitioners may be encouraged to persevere steadily in their attentions."* When this species of colic depends upon the presence of a polypus, or other excrescence in the intestinal canal, beyond the reach of surgical means, the palliation of symptoms is all that can be attempted. The true nature of such cases is scarcely ever ascertained till after death.

GENUS VII.

COPROSTASIS.

COSTIVENESS.

OBSTINATE RETENTION OF THE FECES IN THE INTESTINES.

GEN. VII. THE generic character is expressed in the generic name, which is a compound term importing emansion or retention of feces — κοπροστασις, from κοπρος and ἰστημι, whence the well-known and opposite terms *copragoga* and *eccoprotica*, to express purgatives, or such medicines as quicken the passage of the feces.

Whether
costiveness
be always a
disease.

Whether mere tardiness of evacuation should always be regarded as a disease may be questionable: some persons are accustomed to have their bowels moved not oftener than twice a week; and to such, a week's costiveness is attended with no inconvenience. [The proximate cause of constipation may consist in an unusual slowness of the peristaltic motion of the bowels, or in an obstruction to the passage of the feces, while the proper peristaltic motion continues. The natural action of the bowels is considerably different in individuals of different constitutions, and even in the same individuals at different periods; so that it is not easy to say when the peristaltic motion can be considered as preternaturally slow, while the general health remains good. But it is probable, that, in most habits, a stool should occur once in twenty-four hours, although many persons retain their feces much longer without inconvenience. Dr. Cullen believed that every deviation from a diurnal stool is an approach to an unnatural state.] Rhodius gives a case of feces retained nearly a month †; and Panarolus, one of three months' retention without mischief. ‡ Chaptal relates the

* Willan on Diseases in London, p. 185. † Cent. ii. Obs. 61.

‡ Jatralog. Pentecost. i. Obs. 1.

history of a female, who for four months had no discharge either from the bowels or the kidneys, and as little evacuation by sweat, notwithstanding that her diet was confined to milk-whey and broths. She was at length cured by using the cold bath for eight days successively. When but a very small quantity of food is taken habitually, the egesta bear a like proportion, are small in amount, and usually slender in volume. This is particularly the case with those who are enabled to endure long periods of fasting, as we have already had occasion to observe under *Limosis expers protracta*: and hence the collectors of medical curiosities have furnished us with various examples of feces retained for half a year*, two years†, and in one or two instances not less than seven years‡, without serious mischief.

In all such cases, the feces are discharged in indurated and minute balls, something like sheep's dung. But it does not always happen that those, who labour under this affection, eat sparingly. Professor Thomassini of Parma, in 1808, attended a man, thirty years of age, who laboured under an habitual costiveness of this kind, though his appetite was good, and he was accustomed to eat twice as much as other men. He had been costive from his youth, but the torpor of his bowels had increased yearly. From his twentieth to his twenty-fourth year, he had had only one evacuation every eight or ten days, which interval was afterwards increased to twelve. At thirty, when M. Thomassini saw him, the intervals were extended to twenty-two days. No regimen, nor medicinal process, had produced any benefit. Purgatives, indeed, operated, but occasioned such debility that they could not be persisted in. The heat was natural, but the pulse frequent.§

[A remarkable case was published by Dr. Crampton. The patient, a female in her thirty-seventh year, had had no evacuation from her bowels for eight months, and only two or three motions in the year preceding that in which the particulars were drawn up. She also passed scarcely any urine, and this with pain. Her usual sustenance was tea, toast, milk, and gruel. The abdomen was free from fulness or swelling. In the intervals of meals, she often voided from the stomach matter of stercoraceous quality, and sometimes of an urinary smell.|| The same physician refers also to another similar example which was under his care, and in which a stool was considered quite an extraordinary occurrence. After death, the colon was found immensely distended, nearly impervious at its lower part, and the bladder diseased. In the first of these two cases, a stricture of the colon was likewise suspected.] “Dr. Heberden knew a person, who, all his life, had but one motion a month: he must have had a great deal to carry about with him; and then, as a contrast, the same physician mentions another individual, who had twelve motions a day for thirty years: that must have been equally troublesome — it was perpetual motion.”¶

Costiveness is not necessarily connected with colic, flatulency,

GEN. VII.
Copro-
stasis.

In those
who eat
little.

Yet some-
times
occurs in
great
eaters.

Case of
only two
or three
motions in
a year.

* Salmuth, Cent. i. obs. 24., ii. 65. 98., iii. 26. 45.

† Samml. Medic. Wahrnehmungen, band iv. p. 294.

‡ N. Samml. Medic. Wahrnehm., band i. p. 423.

§ Dict. des Sciences Médicales, art. CAS RARES.

|| See Dublin Hospital Reports, vol. iv. p. 305, &c.

¶ Elliotson's Lectures, Med. Gazette for 1832-3, p. 661. — Ed.

GEN. VII. Copro-
stasis.
May
become
a cause of
colic and
flatulency,
but when
simple,
merely
trouble-
some.

or any severe pains; though, as already observed, under particular circumstances, it may become a cause of all these. In its simple and constitutional form, it is generally rather a troublesome, than a violent or dangerous complaint. But this is not invariably the case: and a constipated state of the bowels, whether idiopathic, or the concomitant of other diseases, is frequently highly injurious to the constitution; producing, when it is idiopathic, a variety of disorders; and aggravating, when symptomatic, the diseases of which it is a symptom. Costiveness may proceed from two very distinct sources; and as each of these possesses symptoms of its own, and is considerably discrepant from the other, we are enabled with ease to contemplate the genus under the two following species:—

1. COPROSTASIS CONSTIPATA.
————— OBSTIPATA.

CONSTIPATION.
OBSTIPATION.

SPECIES I.

COPROSTASIS CONSTIPATA.

CONSTIPATION.

THE FECES WHEN DISCHARGED CONGESTIVE AND VOLUMINOUS;
THE TEMPERAMENT FIRM AND RIGID.

GEN. VII. IN persons of a compact and robust habit, with hearty appetite and
SPEC. I. strong digestive powers, the intestinal absorbents occasionally evince an excess of action; and the feces, while they become hardened in consequence of such action, assume, from their copiousness, the figure and volume of the large intestines through which they pass.

Occasional
causes.

The increased action of the absorbents, which is the common proximate cause of the present species, may be produced by violent exercise, which heats the blood and throws off an excess of fluid in the form of perspiration from the surface; or by too stimulant a diet, particularly of rough port wine. [Travelling in a carriage, or on the water, is said to have greater effect in bringing on costiveness, than more considerable bodily activity. The editor is inclined to believe, that it is rather the confinement, and the want of usual exercise, which should here be regarded as the cause of costiveness; and that the complaint may be imputed, with more probability, to a defective state of the biliary and other abdominal secretions, and to inefficient peristaltic motion, than to an increased action of the intestinal absorbents. Dr. Cullen ascribed costiveness in such cases, to the abstraction of the intestinal fluids, secreted from the mucous glands and exhalant arteries.* With respect to horse-exercise, the editor suspects that the accounts of its producing costiveness are founded on a mistake, and that it generally promotes

* *Materia Medica*, vol. ii. p. 496.

regularity in the functions of the bowels, provided its beneficial operation be not counteracted by intemperance. Many persons who are in the habit of riding, are also in the habit of drinking port, brandy and water, and other astringent heating beverages; and if they suffer from costiveness, the exercise on horseback bears the blame that ought to be laid upon their diet.]

Costiveness may be the result of too astringent a diet; as where bread, for instance, is adulterated with a considerable quantity of alum: for the mouths of the secernent vessels of the intestines, which should pour forth a large portion of fluid, become hereby contracted, and secrete but a small proportion. Astringents, also, by giving some degree of rigidity to the muscular fibres of the intestines, retard the peristaltic action, and thus become a second cause of constipation.

As the feces are forced forward by the peristaltic action of the intestines, it is obvious that, whenever this action is weakened, there must necessarily be a retardation, and consequently an accumulation of the feces. This sluggishness or torpitude of the bowels is produced by various causes; for sometimes the food is too insipid and destitute of stimulants, and sometimes there is a deficiency in the secretion of bile, which appears to be a natural stimulus to the internal surface of the intestines; and we have reason to believe, that the latter is sometimes secreted with its qualities imperfect; and sometimes, also, the muscular fibres of the larger intestines lose a considerable degree of healthy irritability, and are reduced to an extreme of paresis that amounts almost to paralysis. And, if this occur, as it does occasionally, without much failure of the appetite, the accumulation of feces will be in some instances prodigious. In the case of a young woman aged twenty-eight, the distention of the abdomen from this cause was so general as to be mistaken for pregnancy, especially as there was occasional sickness, with menstrual suppression, and a sympathetic enlargement of the breasts. The disease terminated fatally in about three years from its commencement. The colon, which was among the late Mr. Taunton's preparations, he was so obliging as to show me: it measured in circumference more than twenty inches, and on dissection was found to contain three gallons of feces.

[The causes which may obstruct the passage of the feces, without any deficiency of peristaltic action, occur either in the intestines themselves, or the neighbouring parts. In the intestines, a mechanical impediment is sometimes occasioned by a thickening of the coats, which straitens the passage, or by scirrhus tumours, especially near the lower extremity of the canal. Sometimes the cavity is partly filled by calculous concretions. The costiveness attending enteritis has also been referred to a lessening of the calibre of the bowels by spasm; but no doubt now exists that it is rather owing to an interruption of the secretions naturally poured into the intestines, and to a diminution in the action of their muscular fibres; for, as Bichat fully ascertained, it is not the character of an inflamed muscle to contract even with its ordinary vigour. Tumours in the neighbouring parts, compressing the intestines, necessarily impede the passage of the contained feces. Hence, in pregnancy, costiveness is a common consequence of the pressure of the

GEN. VII.
SPEC. I.
Coprostasis
constipata.

Diminished
peristaltic
action.

Feces ac-
cumulated
sometimes
prodigious.

GEN. VII.

SPEC. I.

Coprostasis
constipata.

Why not
always fol-
lowed by
colic.

Intestinal
strictures
more fre-
quent in the
large intes-
tines.

Examples
of the dis-
ease from
this cause.

enlarged uterus on the great intestines; and a steatomatous tumour in the omentum has been known to produce the same effect.]

A stricture in any part of the large intestines, from whatever cause, has a tendency to produce an accumulation of feces, in the same manner as it produces one species of colic. But colic does not always follow; for the bowels are less irritable than usual, and the stomach continues sound. Strictures in the colon have sometimes existed without being suspected. Dr. Baillie has given a striking example in a case related to him by Sir Everard Home, but a still more striking one from his own practice.* In the last, the patient, a shoemaker, aged thirty, subject to habitual costiveness, became at length much more so; and, from having motions three or four times a week, passed them not oftener than once or twice in a week or a fortnight, and this, moreover, with considerable pain in the lower part of the belly; and at length was incapable of passing a motion by any means. The real cause of the disease not being very clearly suspected, the strongest purgatives were given to him, both by the mouth, and in the form of clysters, as five grains of calomel and ten of gamboge; ten grains of calomel and thirty of jalap; and at one time four grains of elaterium, which made him sick, but produced no other effect. Two drachms of gamboge were given in the form of an injection, and afterwards tobacco-smoke, but altogether in vain; as were also draughts of crude quicksilver by the mouth, shocks of electricity through the abdomen, and the affusion of cold water on the feet. His appetite was but little interfered with, and he passed water freely. A scoop was introduced into the rectum, but this gut was found empty. Under this state of things the belly swelled gradually, and at length arrived at an enormous size, and the patient died in the fifteenth week from the last evacuation. An examination after death showed the real nature of the cause; for at the lower end of the sigmoid flexure of the colon there was a narrow stricture, which would hardly admit the passage of a goose-quill, accompanied with an ulcer, which was partly in the situation of the stricture, and partly in the gut above it. This intestine was peculiarly loaded with feces, and enormously distended; the mean of the transverse diameter being above six inches. All the large intestines, where the distention was considerable, had their muscular coat a good deal strengthened, and the longitudinal bands had become twice as broad and thick as in their natural state; the system thus wonderfully accommodating itself, for many weeks, to circumstances which seemed incompatible with the continuance of life. [This case demonstrates the value of the advice, given by Willan, respecting the use of a long bougie, as mentioned in the observations on colica constricta.]

Effects of
constipa-
tion.

The effects of constipation, when long continued, are, pains in the head, nausea and sickness at the stomach, febrile irritation, general uneasiness in the abdominal region, congestion in the abdominal organs; and hence an impeded circulation of the blood, piles, varices in the lower limbs, and, as we have already seen, colic.

* Trans. of a Society for Med. and Chir. Improvement. See also a case, very similar in every particular, reported by Mr. Sterry, in the Med. Repository for May, 1823.

[Many hysterical affections, chlorosis, and chorea, or St. Vitus's dance, formerly supposed to be unconnected with the state of the bowels, are now proved* to be very prejudicially influenced, if not excited by constipation. Even symptoms, bad enough to cause the case to be set down as phthisis, and the patient to be sent to Madeira, were ascertained by Dr. Borthwick to arise from habitual costiveness, and to yield to purgatives.]†

GEN. VII.
SPEC. I.
Coprostasis
constipata.

The best aperients, in the present species of costiveness, are those which quicken the descent of the feces with as little increased action as possible; as diluent drinks sweetened with manna, sugar, or honey; the expressed oils of mild vegetables, as the pistachio, olive, and almond; the oleaginous farina of the cocoa-nut in the common form of chocolate; figs, tamarinds, the pulp of cassia alone, or in the compound of lenitive electuary; neutral salts. Dr. Arbuthnot advised the use of butter, marrow, and fat. Dr. Cullen found four ounces of fresh butter, taken in the morning, produce a stool or two more than usual in the day. Nauseating doses of calomel and ipecacuan, or of calomel and antimonial powder, will also frequently be of use; and the patient should habituate himself to evacuating the bowels at a certain hour of the day, and should even accustom himself to an effort to this effect, though he may not always be successful. And where this milder process fails, the more powerful purgatives must be had recourse to.

Medical
treatment.

In some instances of very great difficulty, and of an anomalous kind, an affusion of cold water has been accompanied with great success after all common cathartics, quicksilver in its metallic state, antimonials of various kinds, and injections of every sort have been tried in vain. Two striking examples of this occur in a letter from Dr. Spence of Guildford to Dr. Reynolds, published in the Med. Trans. of the College.

Affusion of
cold water
sometimes
highly
beneficial.

[By Dr. Daniel, charcoal was found an efficacious remedy. The dose was from one to three table-spoonfuls, given in lime-water, or milk, every half-hour or hour.‡ Spirit of turpentine, in the dose of half an ounce, mixed with an equal quantity of oleum ricini, has also succeeded.§

Charcoal.
Turpen-
tine.

Instead of adopting the latter plans, the generality of modern practitioners would administer the oil of croton, a very minute dose of which has great power in relieving obstinate constipation, when other cathartics, even in large and repeated doses, have no effect. Mr. Iliff has reported fourteen cases, in which its usefulness was most decidedly proved.|| The average dose for an adult is one, or, at the utmost, two drops; and, perhaps, as Mr. Brande observes, the best or at least the most active form for its exhibition, is that of a pill made up with crum of bread. It may also be rubbed down with mucilage, and mixed with half an ounce of any aromatic water.¶ However, according to Mr. Pope, the best mode of administering the oil is to dissolve it first in a little alcohol, in

Oil of
croton.

* See Hamilton on Purgative Medicines.

† Edin. Med. Journal, No. 82. p. 69.

‡ Philadelphia Journal, No. 9. p. 119.

§ Magee, in Edin. Med. Journal, No. 85. p. 307.

|| Lond. Med. Repository, No. 97.

¶ Manual of Pharmacy, p. 183.

GEN. VII.
SPEC. I.
Coprostasis
constipata.

the proportion of about one drop to half a drachm, in which state it may be more easily diffused in some simple fluid; and, by acting on an extensive surface, the purgative effect, he says, is more speedily ensured. The alcoholic tincture, recommended by this gentleman, has been given very successfully to children.* In numerous instances of difficult deglutition, the simple application of the oil to the tongue has answered the purpose. When the stomach is so irritable as not to bear ordinary cathartic medicines, the oil of croton is also a valuable remedy. It has sometimes been given in clysters, in which form the dose may be five or six drops. In one very obstinate case, suspected to depend upon intromission, Dr. Chisholm employed with success a strong solution of common yellow soap, of which more than a large wash-hand basin was gradually, but perseveringly, thrown into the large intestines with Read's syringe.†

Injection of
a solution
of soap.

SPECIES II.

COPROSTASIS OBSTIPATA.

OBSTIPATION.

THE FECES, WHEN DISCHARGED, HARD, SLENDER, AND OFTEN SCYBALOUS; THE TEMPERAMENT WEAKLY, OR THE HABIT SEDENTARY.

GEN. VII.
SPEC. II.
How produced.

THIS is in most cases the result of a sluggishness of the peristaltic motion in persons of infirm or delicate health: in consequence of which the refuse matter of the aliment, usually small in quantity, is a long time passing through the intestinal tube, and hence becomes indurated, shrunk, and shrivelled, so to speak, by the length of time it is exposed to the power of the intestinal absorbents, notwithstanding they may have no such increased action as occurs in the preceding species. This form of costiveness is most frequent in persons of advanced life; in whom the feces, minute in quantity and deprived of moisture, are sometimes discharged in the form of a scroll, and sometimes in small lumps, of the shape of buttons or balls, as I have already observed when treating of *colica constipata*; which affection also, as there remarked, is often produced by the irritation that these retarded materials at length excite. So feeble, indeed, is the expulsive power of the intestines in many cases of old age, that it is sometimes necessary, as recom-

Most frequent in
advanced life.

* See Med. Chir. Trans., vol. xiii. p. 99.

† Med. Repository. The particulars of a case of obstinate constipation were lately communicated to the editor, where a practitioner in the country determined to attempt to draw out the contents of the intestines with a syringe; but instead of succeeding, he contrived to force an enormous quantity of air into the bowels, and to make his patient swell like a balloon when receiving gas. In this condition, the patient was left scarcely able to respire. The blunder was obvious to the family, and the doctor dismissed. — Ed.

mended by Dr. Warren, to introduce a sort of marrow-spoon up the rectum, for the purpose of bringing away the dry masses that have lodged there.

[When a large accumulation of feces takes place in the rectum or colon, it becomes itself the cause of a most distressing constipation, attended with peculiar symptoms, and sometimes terminating fatally. The disorder was first described by an anonymous writer*, and additional cases of it have been subsequently reported.† It is the more important to attend to this complaint, because it assumes the appearance of a diarrhœa, or rather a chronic dysentery, and has often been erroneously treated with astringents and opiates. The patient complains of severe pain about the lower region of the belly, remitting and again returning after frequent but short intervals, and accompanied with a bearing down, and almost continual inclination to go to stool. Only a small quantity, however, of thin discharge, perhaps mixed with little hard knobs of excrement, follows, after which the pain abates. When, from a previous costiveness, and the above-mentioned symptoms, the loaded state of the rectum is to be suspected, this bowel should be examined *per anum*, and the feces broken down and extracted with some convenient instrument. The accumulation that takes place is sometimes very great. This case is frequent in persons of advanced age, and more frequent in the female, than the male sex. Whatever tends to lessen the peristaltic motion of the bowels must induce a predisposition to it; and it has been often occasioned by the long-continued use of bark, opium, and other astringent medicines.]‡

It sometimes happens, however, that a contrary temperament prevails in old age; that the bowels are irritable and the motions loose. Celsus has laid it down as a maxim, that, when the bowels are loose in youth, they commonly become confined in advanced life, and that if confined in youth, in advanced life they are often laxative. Quibus juvenibus fluxit alvus, plerumque in senectute contrahitur; quibus in adolescentia fuit adstricta, sæpe in senectute solvitur.§ I cannot say, that I have been able to confirm this position by my own observation or experience.

In costiveness from this cause, our aperients must be derived from other materials, than those recommended under the last species; for here we have far less reason to be afraid of the warmer and aromatic purgatives. And hence, while we allow a freer use of wine, we may successfully have recourse to aloes, the compound pill of this name, and the balsam of copaiba.

The analeptic pill of Dr. James, which combines a preparation of antimony with resinous purgatives, is often a very serviceable medicine: as is also the form recommended by Dr. Parr, which consists of half a drachm of the gum pill, the same quantity of the pilula aloes cum myrrhâ, with ten grains of antimonial powder, made into fifteen pills.

GEN. VII.
SPEC. II.
Coprostasis
obstipata.

From accumulation of the excrement in great intestines.

Sometimes a contrary habit in advanced life.

Remark of Celsus upon this discrepancy.

Remedial treatment.

* Med. Obs. and Inq., vol. iv. p. 123.

† Duncan's Med. Comment., vol. x. p. 255.; vol. xii. p. 282.

‡ Bateman, in Rees's Cyclopædia, art. CONSTIPATION.

§ Medicin. lib. i. c. 3.

GENUS VIII.

DIARRHŒA.

LOOSENESS.

THE ALVINE EVACUATIONS CRUDE, LOOSE, AND TOO FREQUENT;
WITH LITTLE OR NO GRIPING OR TENESMUS.*

GEN. VIII. Of all the specific forms of this disease, the chief proximate cause, as it is called, or the symptom that gives rise to all the other symptoms, is an increased peristaltic action throughout the whole or a great part of the intestinal canal: and as this may be produced by various means and under different circumstances, it must often stamp a peculiarity in the character of the disorder, and lay a foundation for numerous species.†

Chief
proximate
cause.

* "Pain, or griping, is occasionally an attendant, but not necessarily so." (Drs. Crampton and Forbes in *Cyclop. of Pract. Med.*, art. *DIARRHŒA*.) Professor Elliotson's definition of diarrhœa is, "frequent, liquid, and rather copious feculent stools, not dependent upon debility of the sphincter ani." In dysentery, the stools are not feculent. In diarrhœa, "there is only pain at the time of the evacuation; but in dysentery, the griping is horrid, and is not lessened by the discharge of mucus and blood, which characterises the disease." (*Lectures in Med. Gazette for 1832-3*, p. 593.) — Ed.

† Perhaps, instead of representing increased peristaltic action as the proximate cause, it would be more correct to say, that the essential part of this disease consists in a preternatural augmentation of the peristaltic motion and of the intestinal secretions; the predisposing causes being a peculiar irritability of the intestines and of their secerning vessels. To call increased peristaltic action the proximate cause must be inaccurate, since it exists in several other cases never comprehended under the name of diarrhœa. As a general rule, Drs. Crampton and Forbes join the best modern pathologists in considering the seat of diarrhœa to be the intestinal mucous membrane: "and it is the state of this membrane, and not the discharge, which is to be regarded as the great object of attention. The only exceptions to this rule are the cases where the disease is excited by fluids, poured into the intestinal tube from the annexed glands, or by irritants of a temporary kind, as food or medicines, applied directly to the membrane. Even in these cases, the secondary affection of the membrane is often of much more importance than the cause producing it." In the mildest forms of diarrhœa, it is conceived, that a degree of irritability may exist in the mucous membrane. In another variety, there may be a morbid degree of excitement, or of increased action in the membrane, considered as a secreting and exhaling organ, whereby it throws out its fluids in a morbid state, or quantity, or both. But in a still more numerous class of cases, more or less inflammation of the mucous membrane prevails, from simple slight congestion to alteration of structure. It may be confined to a small portion of the intestinal tube, or it may extend over a large portion of it. In this form of diarrhœa, the evacuations deviate greatly from the character of health, and consist principally of fluids, secreted by the inflamed membrane being mucous, or serous, or flaky from admixture of coagulable lymph, and variously coloured, according to the condition of the liver, the ingestion of food, the previous treatment, &c. (See *Cyclopædia of Practical Medicine*, art. *DIARRHŒA*.) According to the researches of Andral, dysentery, diarrhœa, and lenteria, are far from being constantly associated with one particular state of the alimentary canal. The changes observed in it after death, are most commonly situated in the large intestines, sometimes affecting every part of them; sometimes only certain portions of the tube. Occasionally the cœcum alone is diseased; in other instances, the rectum. The whole of the small intestines may continue sound, and the abruptness, with which the marks of disease often begin to show themselves immediately below

The peristaltic action of the intestines may be increased, and consequently looseness or diarrhœa occasioned, firstly, by irritating materials thrown into them by the mouth; secondly, by a morbid change in the fluids which are naturally secreted into the intestinal canal; and thirdly, by an irritable state of the intestines themselves, or the membrane that lines their inner surface. Independently of which, the same effect may follow, in a variety of ways, from the readiness with which the intestines associate in the action of remote organs. Thus sudden passion or commotion of mind will frequently excite looseness; sudden cold or heat applied to the surface of the skin will do the same. [And, among the diseases of other parts of the body, which affect the intestines, the irritation of dentition in infants may be mentioned as a familiar illustration; as it is seldom difficult, without producing diarrhœa. The sympathy between the skin and the bowels is particularly great in many individuals, so that exposure to damp or cold air, or getting wet in the feet, will generally bring on a diarrhœa. Looseness of the bowels is frequently attendant on measles, scarlatina, and other exanthemata. In these last examples, an excited, or inflammatory state of the mucous membrane accompanies the disorder. Diarrhœa is also a frequent and a most dangerous assailant in the advanced stage of a great variety of diseases, as fevers, phthisis*, chronic hepatitis, lumbar abscesses, diseased joints, &c.; completing that prostration of strength usually seen a little before their fatal termination.] But as all affections of this last kind are evidently cases of mere sympathy, they must be

GEN. VIII.
Diarrhœa.
Peristaltic
action how
increased.

Often
occurs from
sympathy
with other
organs.

the valve of the cœcum, is a remarkable fact. On the other hand, sometimes no vestiges of disease are found in the large intestines, and the termination of the small ones is the only part affected. Most commonly, both the lower end of the ileum, and a more or less extensive portion of the larger intestines, are the seats of alterations, which differ in kind from a mere vascular fulness to the most complete ulceration, or softening of texture. Neither do the morbid appearances bear any constant relation to the duration, or symptoms of the disease; for, in a given number of subjects, as nearly as possible similarly circumstanced in the two latter respects, we may find in one only a simple hyperemia; in another, a softening of the mucous membrane with redness; in a third, a pale softening of the same texture; in a fourth, an induration of it with various shades of colour; in a fifth, an enlargement of the follicles, without any other morbid appearances; in a sixth, ulcerations, varying in number and size; and, in a seventh, together with one or another of these affections of the mucous coat, different morbid conditions of the other tunics, such as thickening, infiltration with serum, &c. Even the symptoms fail to denote the particular kind of alteration that may exist in the intestines, and the very same morbid appearances sometimes occur in subjects who have had a serous, or bilious looseness, as are met with in other cases, where the assemblage of symptoms constitute dysentery. Frequently there is an entire absence of fever and pain, when the mucous coat has numerous ulcerations in it, surrounded with a red, brown, or black thickening of that texture. In a few examples, dissection reveals no morbid appearances whatever, and affords no explanation of the functional disorder. Then there are certain diarrhœas, arising from a morbid secretion produced out of the intestines themselves, but passing through them to be discharged. Andral, Précis d'Anat. Pathol., t. ii. p. 204. — Ed.

* The diarrhœa generally occurring in the latter stages of phthisis, depends on ulceration of the mucous membrane. The ulcers are sometimes very numerous, and scattered over the greater part of the intestinal canal: at the extremity of the ileum, however, they are more commonly found than in any other situation. On this subject valuable information is contained in the works of Andral. — Ed.

GEN. VIII. excluded from the history of diarrhœa considered as an idiopathic
Diarrhœa. disease; and even in their treatment can only be remedied by
remedying the primary complaint. [Cholera and dysentery often
commence in the form of diarrhœa.]

The subdivisions of diarrhœa may be resolved into the seven
following:—

| | |
|---------------------|---------------------|
| 1. DIARRHŒA FUSA. | FECULENT LOOSENESS. |
| 2. ————— BILIOSA. | BILIOUS LOOSENESS. |
| 3. ————— MUCOSA. | MUCOUS LOOSENESS. |
| 4. ————— ALBA. | WHITE LOOSENESS. |
| 5. ————— LIENTERIA. | LIENTERY. |
| 6. ————— SEROSA. | SEROUS LOOSENESS. |
| 7. ————— TUBULARIS. | TUBULAR LOOSENESS. |

SPECIES I.

DIARRHŒA FUSA.

FECULENT LOOSENESS.

THE FECES OF COMMON QUALITY, BUT IMMODERATELY LOOSE AND
COPIOUS.

GEN. VIII. THIS species generally works its own cure without the aid of
SPEC. I. medicine: for its common cause is food eaten to excess, or in-
Common termixed with an undue proportion of irritating materials, saline,
causes. saccharine, or vinous; in consequence of which it passes rapidly,
and not thoroughly digested, from the stomach, and urges the in-
testines to an undue degree of activity. Hence often, antecedently
to the looseness, there is a sense of sickness, and perhaps a few
slight torminal pains. But if the disorder do not prove its own re-
medy, it is easily removed by any common purgative. In weakly
stomachs, or where the intestines are sluggish, this mode of diarrhœa
is also occasionally produced by a retardation of the aliment, till it
irritates from acescency, putrescency, or superabundant accumu-
lation; and where it is not checked in due time, it will occasionally,
like several of its cognate species, run into a chronic form, and
prove extremely troublesome and obstinate. In some cases, it has
lasted for two* and even for three years†, and it then requires to
be restrained with caution; for a sudden transfer to a state of cos-
tiveness has often produced some other severe complaint. And the
same remark may be applied to the diarrhœa that occurs during
dentition, which ordinarily keeps off febrile irritation; and, when
violent, should be moderated, but not subdued.

For the
most part
easily
cured, and
often cures
itself.

Sometimes
chronic and
obstinate;
and then
requires a
cautious
treatment.

This species is also produced occasionally by sudden exposure to
cold, and especially by cold bathing; by great agitation of mind,
and particularly that of fright, or anger, sometimes even when those
passions have merely existed in dreaming‡; and occasionally also

* Riedlin, Cent. iii. Obs. 90.

† Forestus, Lib. xxii. Obs. 3.

‡ Ephem. Nat. Cur. Dec. i. Ann. iii. Obs. 234.

by the bare sight of a purgative or other medicine which the patient is reluctant to swallow. All these are instances of sympathetic action, which has sometimes shown itself in perhaps a still more extraordinary way, where there has been a peculiar irritability of habit. Thus Borrichius relates a case, in which it was produced by introducing a globule of black hellebore into an issue in the arm.* [In certain individuals this idiosyncrasy is so strong, that particular articles of food quite inoffensive to the generality of people will invariably bring on diarrhœa. The complaint is frequently produced by a sudden change of diet, as from an animal to a vegetable one; or by a change of the water, or bread, to which we have been accustomed. In this species of diarrhœa, as indigestion and crudities in the stomach are frequently the cause of the complaint, emetics have often been found serviceable. But purging has been supposed to be still more necessary to remove the crudities that have passed into the bowels. The celebrated Cullen believed, however, that this practice is founded upon very erroneous notions. It rests upon the supposition of an acrimony present in the intestines, that ought to be carried out by purging. But from whatever source the acrimony proceeds which can excite a diarrhœa, it may be considered, he says, sufficient to evacuate itself, so far as that can be done by purging. Dr. Bateman pronounces this opinion extremely rational, and observes that, when merely opposed to the indiscriminate use of purgatives in diarrhœa, its justness is undeniable. But he believed, that Dr. Cullen, in avoiding one extreme, gave a sanction to another. In a recent case of idiopathic diarrhœa from excesses at table, or cold, a gentle purgative is seldom, if ever, in the slightest degree hurtful. However plausible the supposition, that the irritating matter in the bowels will invariably purge itself off, experience proves, that it is frequently very imperfectly voided, and that a part of it remains behind, keeping up a degree of irritation often continuing the disease, and even converting it into dysentery. Whenever any material degree of tenesmus is observed, a purgative is generally indicated; and if the bowels be very irritable, opium may be combined with it.† In these cases, calomel and ipecacuanha, calomel and rhubarb, or rhubarb with the tinctura or confectio opii, are invaluable medicines. When the case resists these medicines, small doses of the chalk mixture, with the tinct. catechu, the compound powder of kino, and tinct. opii, may be exhibited; and in very long protracted, unyielding examples, the camphor mixture with nitrous acid and opium‡, or the sulphate of copper joined with opium, may be given twice a day, in the dose of half a grain, gradually increased to that of a grain and a half, as recommended by Dr. Elliotson.§ In every form of diarrhœa, the

GEN. VIII.

SPEC. I.
Diarrhœa
fusa.Examples
of sym-
pathetic
action.

* De Qualitat. Occultis, Dissert. et Orat. Acad. Hafn. 1715.

† Bateman, art. DIARRHŒA, in Rees's Cyclopædia.

‡ R. Acidi Nitrosi dilut. ʒj. Misturæ Camph. ʒviiij. Tinct. Opii guttas xl. Cochl. magn. iv. quarta quaque hora sumend. Recommended by Mr. Hope in Edin. Med. Journ. No. 88. At the Bloomsbury Dispensary, a very efficient medicine for checking the diarrhœa, which occurs in the fruit season, is found to be the camphor mixture, with ten grains of the subcarbonate of soda, and one drachm of the tincture of capsicum to each dose. — Ed.

§ See Med. Chir. Trans., vol. xiii.

GEN. VIII.
SPEC. I.
Diarrhœa
fusa.

diet is a most important consideration : it should consist of milk, rice, arrow-root, tapioca, sago, jelly, beef-tea, or broth. In particular, all malt-liquor should be avoided, and weak brandy and water, wine and water, or barley-water, preferred.*]

SPECIES II.

DIARRHŒA BILIOSA.

BILIOUS LOOSENESS.

THE FECES LOOSE, COPIOUS, AND OF A BRIGHT YELLOW.

GEN. VIII.
SPEC. II.

FROM the highly bilious tincture of the dejections, there can be no doubt that the bile, in this species, is secreted in a greater quantity than usual, and perhaps with an unusual degree of pungency ; and hence the excess of peristaltic activity.†

Common
remote
causes.

Differ in
the symp-
toms they
produce.

Liver, how
affected by
summer
heat.

The most common remote cause of this species of diarrhœa is a great and sudden increase in the temperature of the atmosphere, or a less than its mean degree of heat, operating for some weeks or months. Dr. Lind has justly remarked, that a rapid change of climate, whether from a colder to a hotter, or from a hotter to a colder state, is equally apt to excite diarrhœa. But the complaints, hereby produced, are of very different characters. That occasioned by sudden cold consists of an acrid mucous discharge, and will be treated of and explained under the next division. The diarrhœa, excited by passing rapidly from a cold into a hot climate belongs to the division before us, and depends upon an increased secretion of bile of bad quality. The calorific rays of the sun exercise a peculiar influence upon the organ of the liver, and soon stimulate it to an augmented action. In the intertropical regions, the quantity of bile hereby secreted is even more than the bile ducts can conveniently carry off; whence some portion of it retro-

* In the treatment of every diarrhœa, the first thing is to inquire into the cause. When the mucous membrane of the bowels is in a more or less inflamed state, and there is tenderness on pressure, as is illustrated in the diarrhœa of measles, diluents, astringents and opium will not answer, unless leeches and a blister be applied to the abdomen. When the exciting cause is improper diet, this must be changed.

Ed.

† This diarrhœa is not necessarily attended with any morbid change in the intestines, in which nothing but an unusual quantity of bilious matter is detected by dissection. The disorder, as Andral observes, is here brought on by a morbid secretion, not produced in the bowels themselves, but taking its course through them, in order to be discharged. When it is removed, the subjacent mucous coat is found quite unaltered, and its vessels scarcely more injected than natural. The source of the complaint, as well as of certain kinds of constipation, is in the liver. Every preternatural flow of bile into the intestines, then, is not invariably the effect of some irritation first existing in them. Other organs in the neighbourhood of the alimentary canal may accidentally communicate with it, and pour into it their different secretions, healthy or unhealthy. Thus, Andral has seen three cases, in which a purulent diarrhœa was kept up by the matter of ovarian abscesses passing through ulcerated openings into the rectum; and an interesting fact of the same kind is recorded by M. Dalmas. See Andral, Anat. Pathol. t. ii. p. 206., and Journ. Hébd. de Méd. Nov. 1828. — Ed.

grades, and is carried by absorption into the system, and is one of the causes, though not the only cause, of the darker hue of the skin in those quarters. In our own country, this species of diarrhœa is therefore found most commonly in the earlier part of the summer, when suddenly and vehemently bursting upon a cold spring; or in the autumn, when the liver has for many weeks been exposed to the effects of a very vigorous sun, and the whole system has become relaxed and debilitated. If at this time the atmosphere be pure, the disease is simple, and may be subdued without much difficulty; but if the rays of the sun should carry off the greater part, but not the whole, of the stagnant water from the fens and marshes of a country, and convert them into corrupt and offensive swamps, the atmosphere will be loaded with an effluvium of decomposed organized matter, animal or vegetable, or both, and the simple bilious diarrhœa will be converted into a remittent bilious fever; and hence, in few words, the common origin of the bilious autumnal fevers that so frequently prevail at the close of the summer season.

When the bilious diarrhœa is simple and unconnected with fever, it is seldom a formidable disease: a few doses of calomel, with a view of emulging the bilious pores of the liver, correcting the irritation of the organ, and taking off its increased action, with the assistance of mild diluents and demulcents, as infusions of linseed, quince seeds, or comfrey roots, for lubricating the intestinal canal, which has participated in the irritation, will usually prove a successful practice. The last was at one time a popular medicine in diarrhœas, and Dr. Cullen objects to its being omitted in the *Materia Medica* of the Colleges. If the flux, and consequently the excitement of the liver, should still continue, opiates may be employed with advantage.

GEN. VIII.
SPEC. II.
Diarrhœa
biliosa.

Sometimes
converted
into a bili-
ous remit-
tent fever.
Medical
treatment.

SPECIES III.

DIARRHŒA MUCOSA.

MUCOUS LOOSENESS.

THE DEJECTIONS CONSISTING OF, OR CONTAINING, A COPIOUS DISCHARGE OF MUCUS.

THIS species bears a striking resemblance to the defluxion from the nostrils in catarrh. Its common cause is cold, particularly in the feet; the motions are acrid, often with but little bilious tinge: and like the nostrils in a catarrh, the lower part of the rectum is excoriated. It is hence denominated by many writers *catarrhus intestinorum*, and by Dr. Boerhaave *diarrhœa catarrhalis*.

The disease is, perhaps, also sometimes produced by acrid ingesta, as a coryza is occasionally excited by sternutatories in those not accustomed to them. Here the process of purging will rather add to the complaint than diminish it; and copious diluents and demul-

GEN. VIII.
SPEC. III.
Causes.

Why called
catarrhus
intestino-
rum, or
diarrhœa
catarrhalis.
Purging
injurious.

GEN. VIII.
SPEC. III.
Diarrhœa
mucosa.
Copious
diluent.
Often occa-
sioned by
a rapid
change of
tempera-
ture in tra-
velling, or
voyaging.
Illustrated.

cents afford the most rational mode of treatment: with which plan the daily diet should be made to coincide.

This species of mucous or catarrhal diarrhœa, like the two preceding, is also frequently produced by any sudden change in the temperature of the atmosphere from great heat to great chillness; and hence its frequency and severity in passing rapidly from a warmer to a colder climate, as into the North Seas in the summer time. "In the outward-bound passage of the vessels employed in the whale-fishery on the coast of Spitzbergen," says Mr. Macartney Ross, "I have more than once had occasion to remark the very great effect of a transition into a cold latitude in deranging the state of the alvine discharge. The vessels destined for this often perilous voyage, generally leave England about the end of March, when the weather is comparatively temperate. A week or two serves to convey them within the Arctic Circle, in the course of which time few cases are beginning to appear. But after being fairly within the limits of the Frozen Sea, and encompassed with ice, so that the wind even carries with it a strong and penetrating frost, the cases daily increase both in number and severity. The weather becoming progressively milder after the beginning of May, and the seamen by this time being more inured to the climate, few or no cases are met with; and such as do occur I have always found to arise from the patient having been called suddenly from bed in the course of duty, and exposed to an intensely freezing atmosphere."

In this case
how to be
remedied.

Where the looseness, of whatever species, is produced by a sudden chill on the surface, small doses of ipecacuan, with or without opium, have generally been given with advantage.* Fernelhuys† and Dr. Fothergill‡ recommend it alone: Dr. Stoerck§, with more reason, in combination. And if the disease should become chronic, the warmer bitters and astringents should be had recourse to, as columbo, — to which also Dr. Stoerck recommends an addition of laudanum ||, — cusparia, and arnica (*doronicum pardalianches* Linn.), which, though rejected in our own country, maintains its reputation all over the Continent. Of the arnica root, Dr. Stoll used to give a drachm every two hours.¶

SPECIES IV.

DIARRHŒA ALBA.

WHITE LOOSENESS.

THE DEJECTIONS MILKY, OR RESEMBLING IN THEIR APPEARANCE
A MIXTURE OF WATER AND LIME, WITH A FROTHY SCUM.

GEN. VIII. [In the preceding editions of this work, the learned author
SPEC. IV. described two species under the names of diarrhœa chylosa,

* Toxe, Bibl. i. p. 118.

† An omni alvi fluxui radix Brasiliensis? Paris, 1706.

‡ Med. Observ. and Inquir. vol. vi. art. 18.

§ Klinische und Anatomische Bemerkungen, p. 7.

|| Ibid.

¶ Mat. Med. Part II. p. 307. Part III. p. 163.

and diarrhœa gypsata. The first is the case denominated in Cullen's Nosology "diarrhœa cœliaca, quâ tumor lacteus, specie chyli dejicitur." The appellation of chylous looseness, had it been merely used as a simile, would have been but of little consequence; but, promulgated as it has been by various experienced physicians, and even by Dr. Good himself, as derived from the really chylous nature of the excrement, it becomes a vehicle of error, and the judgment of the practitioner in the sick-room is too apt to be blinded by it.]

The colour of the stools, according to Dr. Good, affords evident proof, firstly, that the bile, which gives the usual tinge to the feces, is either not secreted, or impeded in its flow into the intestines; and, secondly, that the food, after being converted into chyle, is not absorbed and carried into the system.

The non-absorption of the chyle must proceed from some mischief in the lacteals or mesenteric glands: which may either labour under such an inertness or torpitude as to render them incapable of carrying on their proper function, or may be so obstructed in their course as to be prevented from exercising their function, notwithstanding their being in a state of health.

[Dr. Rummel* has taken an excellent survey of the various descriptions of this supposed disease given by authors, and ably exposes the mistake they all committed in believing, that there was such a disease as diarrhœa chylosa, the existence of which he completely disproves. It is to Dr. Graves, of Dublin, however, that the profession in this country is under particular obligations, for his judicious notice of the erroneous doctrines, broached concerning the white forms of diarrhœa.† A gentleman applied to him, after having suffered a good deal from an epidemic dysentery. The febrile symptoms, and discharge of blood, had ceased for many weeks; but the emaciation and weakness continued to increase. He had one or two natural stools daily, without tenesmus; but, in the course of every twenty-four hours, he experienced eight or ten sudden calls to stool, attended with an impossibility of resisting the bearing down and weight felt in the rectum. Each evacuation consisted merely of two or three table-spoonfuls of muco-gelatinous matter, which varied in colour and consistence, but generally resembled thick milk, or a puriform fluid, and occasionally a transparent jelly. This fluid was evidently a secretion from the mucous membrane of the rectum in a state of irritation, or chronic inflammation. It is observed by Dr. Graves, that such a condition of a mucous membrane constitutes the disease denominated chronic blennorrhœa; and, when it occurs in the rectum, produces a disease, which, on account of the white colour of the discharge, would formerly have been called fluxus cœliacus, and the evacuation attributed to the loss of chyle by stool; for the chyle was supposed to be formed, but not absorbed, or carried into the system. As Dr. Graves very properly remarks, it is even less surprising, that Dr. Good should have retained the old species, diarrhœa chylosa, than that he should have inserted a new one, whose existence rests upon still more doubtful evidence. This new species he named diarrhœa

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

No such
disease as
diarrhœa
chylosa.

View of
proximate
causes,

and remote
causes,
adopted by
the author.

Symptoms
of one form
of diarrhœa
alba.

Secretion
from the
mucous
coat of the
intestines
in a morbid
state.

* Hufeland's Journal, June, 1825.

† See Dublin Hospital Reports, vol. iv. p. 46, &c.

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

The reality
of gypseous
diarrhœa
unproved.

Causes of
the white
appearance
of the
motions.

Secretion
from the
mucous
coat of
small
intestines
also liable
to changes.

One variety
described
by Dr.
Baillie.

gypsata, in consequence of the evacuations resembling in their appearance a mixture of water and lime, which appearance he actually fancied to depend upon the presence of earthy particles in the fluid discharged. This view of the subject he also fortified by several ingenious, but premature, reflections on the power of animals to secrete lime, and especially on the presence of lime in the intestinal calculi.

Unfortunately, the main and essential proof of the existence of lime in the motions was wanting, all chemical analysis of them having been neglected. Dr. Graves has often seen stools of the colour here described, and so has the editor of this work, which colour was referable to the absence of bile, and a morbid secretion of white viscid mucus from the intestines. Viscid and whitish discharges from the mucous membranes lining the eyelids, bronchial tubes, urethra, vagina, &c. are, as Dr. Graves observes, extremely common, and depend on a state of irritation similar to that which produces the white and scanty alvine evacuations arising from the mucous membrane of the rectum. It is evident, says he, from the case I have related, that chronic irritation of this part may produce much constitutional disease. When, however, the affection extends beyond the rectum, to the other portions of the large intestines, it occasions symptoms still more urgent. That a similar state of the mucous membrane lining the small intestines may occur, and give rise to a white secretion from its surface, is proved by examination of their contents in persons who die of the East Indian cholera, in many of whom white milk-like stools are observed during life. On dissection, these stools are found to depend on a secretion from the small intestines. The diarrhœa alba, described by Hillary as occasionally epidemic in Barbadoes, probably arises from a similar cause. This latter name, as conveying no erroneous hypothesis, the editor ventures to recommend for all the cases comprised under the heads of diarrhœa chylosa and diarrhœa gypsata in the former editions of this work. It is a name that simply expresses the fact of the white colour of the motion, without involving the reader in any hypothesis, respecting chyle or lime being parts of what is voided.

For a description of the disease to which the objectionable epithet gypsata was applied, Dr. Good says:]

I am chiefly indebted to a valuable paper of Dr. Baillie, communicated to the London College, and published in its Transactions.* "The evacuation," says he, "consists of a matter resembling in its appearance a mixture of water and lime, which is generally very frothy on its surface. When the disease is violent, the discharges are copious and very numerous, of a pale colour and sour smell, and the froth looks like yeast. When it changes to a milder form, the evacuations are still more or less pale, but of the consistence of pudding, and do not occur oftener than two or three times in twenty-four hours. The appetite is often good, but sometimes defective. The countenance thin and sallow, but not much emaciated. The pulse varies but little from the standard of health, but is rather disposed to acceleration. The tongue is generally covered with a white fur of moderate thickness: the urine of somewhat deeper hue than

natural, generally clear, occasionally turbid. An examination of the abdomen discovers nothing unnatural. The bowels are apt to be distended with wind, but there is no tumour, nor sense of pain upon pressure."

The disease occurs most commonly in persons who have resided for a considerable time in a warm climate, or who have suffered from affections of the liver: but it is sometimes met with in persons who have never left England, or been conscious of any hepatic complaint. It takes place more commonly in men than in women, though chiefly so, perhaps, because men endure the evils of hot climates more frequently than women.

Sometimes there will be a state of amendment indicating a cure. The motions become figured, and of a darker hue, but rarely of the deep colour of health. This improvement, however, is mostly of only a short duration, and the patient soon relapses into the habit of frothy dejections. Those who are afflicted often live for several years, but the disease continues with the changes just noticed, and they hardly ever fully recover. The mind, as in other diseases of irritable temperaments, seems to exercise some influence; for the symptoms are aggravated, or the exacerbations appear more frequently, under the embarrassments of business, or the agitations of anxiety. Repeated returns of the complaint at length wear out the constitution, and the patient sinks from corporeal exhaustion.

In the case formerly termed diarrhœa chylosa, and supposed to depend sometimes upon obstruction of the lacteals and mesenteric glands, and sometimes upon a scanty supply of bile, Dr. Good recommended the following practice. In the first case, he says, the object is to remove the obstruction, which may be best accomplished by active stimulants, as calomel. In the second, if calomel be given at all, it should be in very small doses; but the common preparations of zinc and iron offer a better chance of success: and the *rheum rhaponticum*, or English rhubarb, being very slightly aperient, and far more astringent than the *rheum palmatum*, a useful medicine in various kinds of looseness from relaxation, may here also be employed to advantage, in doses of a scruple taken twice a day; and, where a more powerful vegetable astringent is required, we may find it in the leaves and young twigs of the *rhus coriaria*, or common sumach; which, however, are chiefly cultivated in our own country for dyers and tanners. The berries possess a like property, and are acid, austere, and cooling. To these medicines may be added blisters, or rubefacients to the abdomen.

[The editor of this work is not inclined to place much reliance on any part of the above practice, except the calomel and blisters. As the disease seems to be connected with a scanty secretion of bile, and a morbid state of the secreting vessels of the mucous coat of the intestines, small doses of calomel, or the blue pill, joined with opium, counter-irritation of the skin of the abdomen, and anodyne or astringent injections, seem to him the most advisable remedies at first; and they may be followed by tonics, and other alteratives, according to circumstances. In particular, the nitrous æther, and tinct. opi, which have been frequently exhibited in the camphor mixture, in many inveterate cases of diarrhœa, with superior effect, should be recollected.]

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

Constitu-
tions chiefly
attacked
by it.

Process
slow, and
improve-
ment often
deceitful.

Affected by
the state of
the mind.

Medical
treatment.

GEN. VIII.
SPEC. IV.
Diarrhœa
alba.

In the examples characterised by the resemblance of the stools to a mixture of lime and water, Dr. Baillie estimates the influence of medicine as very inconsiderable. Half a grain of calomel, three grains of pilulæ hydrargyri, or a few of the hydrargyrum cum creta, taken every night, or every second night, have occasionally produced some advantage, by stimulating the liver to a better and more plentiful secretion of bile, without impairing the strength of the constitution; and bitters, as cascarilla or cusparia, combined with a few drops of laudanum, have also occasionally had their use. But, according to Dr. Baillie, the benefit is often only temporary. [Since the period, however, when this eminent physician wrote his observations, experience has pronounced the sulphate of copper to be a valuable medicine for the relief of this and other forms of obstinate chronic diarrhœa. Dr. Elliotson prescribes, at first, half a grain of it twice a day, joined with one grain of opium. The dose is afterwards gradually increased to one grain and a half, or two grains; and the diet consists of milk, arrow-root, beef-tea, and a little wine.*

On the authority of Dr. Rummel, who had employed the extract of nux vomica, Dr. Graves resolved to try the effect of strychnine in cases of diarrhœa alba. One twelfth of a grain was given, in the form of a pill, twice a day, and with a successful result. Dr. Rummel observes, that, after endeavouring to remove the original cause of the disease, the best remedies are narcotics, combined with strengthening and astringent medicines. Nux vomica, he says, possesses a peculiar power in controlling blennorrhœa of the rectum. In the cases recorded by Dr. Rummel, he employed sulphate of iron and columbo, besides sulphur, which has a particular action on mucous surfaces. The cure was generally promoted with hyoscyamus, or opium, joined with nux vomica.]†

SPECIES V.

DIARRHŒA LIENTERIA.

LIENTERY.

THE DEJECTIONS CONSISTING OF THE ALIMENT PASSED RAPIDLY,
AND WITH LITTLE CHANGE.

GEN. VIII.
SPEC. V.
Proximate
cause.

THE signs entering into the definition of this species prove sufficiently, in the first place, that the stomach is in a morbid state, and that the gastric juice is not secreted in a proper quantity or with proper qualities; and next, that the bile is either not duly secreted, or else obstructed in its passage; for were there a free flux of it, the feces, however crude, would display their common yellow hue, which they rarely exhibit. [According to other writers, however, lenteric diarrhœa depends upon a morbid irritability of

* See Med. Chir. Trans., vol. xiii. p. 451, &c.

† Graves, in Dublin Hospital Reports, vol. iv. p. 50.

the stomach and bowels*, whence the food is prematurely expelled from the former organ into the intestinal canal, in an imperfectly digested state; and the bowels themselves, being also morbidly sensible, very quickly void whatever they receive. The motions are at the same time loose and liquid, the exhalant vessels and excretories of the mucous glands pouring out an abundant quantity of their respective fluids. The disease is generally accompanied with great weakness of the digestive power, as well as morbid irritability of the stomach.] Lientery (λειεντερία), lubricitas intestinorum, was the name given to this disease by the Greeks, and it is here retained. The Latins, with a loose translation of the term, called it *levitas intestinorum*; and the general idea expressed by both is, that the aliment passes lightly or fleetly along, and with little elaboration by the intestines; whose peristaltic action is at the same time quickened.

GEN. VIII.
SPEC. V.
Diarrhœa
Lienteria.

Specific
name,
whence
derived.

[The view taken by Dr. Good, of the causes of the present disorder, led him to recommend the general plan prescribed for dyspepsia. According to other physicians, however, the indications are, first, to lessen the irritability of the whole alimentary canal, by the exhibition of opium, joined with astringents and absorbents; secondly, to increase the digestive power of the stomach, by the administration of tonic bitter medicines, as the infusion of cascarrilla, gentian, or orange peel, the decoction of cinchona, or small doses of the sulphate of quinine. Moderate exercise, especially on horseback, will tend to re-establish the functions of the stomach; and all cold articles of diet, or such as are difficult of digestion, should be avoided; particularly salads, and other raw vegetables. Dr. Bateman once witnessed a severe attack of lientery, brought on by eating a little ice-cream, when the patient had been previously suffering from indigestion; the enfeebled digestive powers seemed to sink at once, and the food was discharged almost unchanged. When the alimentary canal is in the above-mentioned irritable state, the invalid should refrain from exercise immediately after meals.]

SPECIES VI.

DIARRHŒA SEROSA.

SEROUS LOOSENESS.

THE DEJECTIONS ALMOST ENTIRELY LIQUID AND LIMPID.

FROM the thin fluidity of the stools in this species, Hoffman has described it by the name of *diarrhœa aquosa*. It is evidently dependent upon a very irritable state of the excretory vessels of

GEN. VIII.
SPEC. VI.
Diarrhœa
serosa.

* Bateman, in Rees's Cyclopædia, art. LIENTERY. As if physicians were never to agree, it is the opinion of Drs. Crampton and Forbes, that "the variety (of diarrhœa) termed *lientery*, in which undigested aliment appears in the stools, has no claim to be considered as a distinct form of diarrhœa, as the circumstances supposed to characterise it may occur in every species of the complaint." Cyclop. of Pract. Med. art. DIARRHŒA. — ED.

GEN. VIII. the intestines; and sometimes holds the same relation to the third
SPEC. VI. species, *diarrhœa mucosa*, as the limpid defluxion of an incipient
Diarrhœa catarrh does to the mucous discharge in which it terminates. Yet
serosa. the irritation is here much greater than in mucous diarrhœa, often
Proximate produced by different causes, and frequently requires a different
cause. mode of treatment. The mucous diarrhœa, or indeed any of the
preceding, may run into it if long continued; for the common
Purging cause of the irritation is debility of the excretories. Here, again,
mischiev- it must be obvious, that purging of any kind would be mischievous:
ous. and the most effectual plan of success that has occurred in my
Gentle own practice, has been the use of warm astringents and gentle
stimulants stimulants or tonics.

The simarouba (*quassia simarouba*) is particularly entitled to
our attention, and will indeed be found useful in most of the
species of the genus before us; as will also, in many cases, the
Simarouba. lopez-root (*lopezia mexicana*), which by Gaubius* was preferred
Lopez- to the simarouba, and which seems to operate at least as much by
root. tranquillising the irregular or spasmodic action of the intestinal
canal, as by any astringent power it may possess. The *geum*
Caryophyl- *urbanum* Linn., better known by the officinal name of caryophyllata,
lata. or herb bennet, was formerly in high repute for all complaints of
this kind; its taste is aromatic and austere.

The *punica granatum*, balaustine or pomegranate-tree, is still
continued in several pharmacopœias, and employed in practice in
Pomegra- this and the preceding species, both in the flower and bark: the
nate. latter seems to have been a favourite medicine with Dr. Mead,
who prescribed a decoction of it with red roses and cinnamon, in
various diarrhœas proceeding from debility. Cullen† thinks highly
of it. It is, indeed, a powerful astringent, and as such is entitled
to attention; but it has a roughness so unpalatable as to disqualify
it for general use. Where these cannot be retained on the stomach,
alum alone may often be had recourse to with advantage; and
Dr. Cullen expresses his surprise that it is not employed more
frequently or more freely. His dose is four grains at first, and
afterwards a scruple several times a day.‡

Where the disease is of very long standing, we often gain great
benefit by uniting a tonic or astringent with a diaphoretic, thus
strengthening the bowels, while we take off irritation by exciting
a transfer of action on the skin. Upon this principle Dr. Fordyce
proceeded when he prescribed a combination of tormentil and
Transfer of ipecacuan. A like transfer of action has sometimes been attempted
action. by issues, blisters, and setons. Hippocrates, with more reason,
employed for the same purpose emetics§, and has been followed
Emetics. by Fontaine and other practitioners; and Malvachini, with the
same view, recommended diuretics.|| Dr. Lind¶ and Dr. Adair**
Calamine. have recommended the native carbonate of zinc, or officinal calamine
in fine powder.

* Adversar.

† Mat. Med. vol. ii. p. 44.

‡ In large doses it occasions nausea, vomiting, colic, and purging: in small ones, constipation. In old diarrhœas, when ulceration of the mucous membrane exists, alum may be productive of mischief. See A. T. Thomson's Elem. of Mat. Med., vol. ii. p. 59. — Ed.

§ *Περὶ Πανδαν*, lib. iii. p. 523.

¶ On Diseases in Hot Climates.

|| Utiles Collectiones.

** Medical Commentaries, &c.

In a very obstinate case that fell to my lot a few years ago, in which the patient, a young woman of twenty-four, had, for ten years, never passed fewer than nine or ten watery stools a day, sometimes tinged with blood, and often accompanied with great spasmodic pain, I found the disease yield in a few weeks to camphor mixture and pills of the resinous gums, after that, as I had reason to believe, all the usual routine of astringent earths and salts, astringent purgatives and narcotics, had been tried, and spent their force in vain. It is probable that, in some cases of this kind, the superacetate of lead, in doses of a grain, combined with three or four drops of laudanum, might prove equally useful. [Here, also, the sulphate of copper in the dose of half a grain, gradually increased to a grain and a half, joined with opium, and given twice a day, merits trial, the experience of Dr. Elliotson being strongly in its favour.*]

This disease is also occasionally produced by drastic purges, as elaterium; and is often critically employed by nature to carry off dropsies, and some other remote accumulations of fluids.

GEN. VIII.

SPEC. VI.

Diarrhœa
serosa.Camphor
and resin-
ous gums.Superace-
tate of lead.

SPECIES VII.

DIARRHŒA TUBULARIS.

TUBULAR LOOSENESS.

THE DEJECTIONS CONSISTING MORE OR LESS OF MEMBRANE-LIKE TUBES, WHITISH, VISCOUS, AND INODOROUS.

I HAVE never hitherto seen this species arranged, and not often described; but it occurs frequently in practice; and appears to depend upon a peculiar irritability of the villous membrane of the larger intestines, which, in consequence, secrete an effusion of coagulating fibrin, fibrin mixed with albumen, instead of secreting mucus, occasionally accompanied with some degree of chronic inflammation. It has a striking resemblance to the fibrous exudation thrown forth from the trachea in croup, but is usually discharged in longer, firmer, and more compact tubes. There is commonly a considerable sense of heat and uneasiness in the rectum; and upon evacuations, the sphincter, partaking of the irritability, contracts so forcibly, that the feces are discharged with great pain and of very small calibre.

From the laminated appearance of this effusion, it has generally been mistaken for a separation of the mucous membrane of the intestines; with which it seems to be confounded by Dr. Simson†; but the exudation has no vascular structure, will not bear extension, and loses its form as soon as handled. At the time of writing, I have a case of this description under my care, in a lady of delicate habit, twenty-eight years of age, who has been long labouring under a peculiar irritability of the rectum, giving rise to some

GEN. VIII.

SPEC. VII.

Never
hitherto
arranged or
described.Exudation
like that
discharged
in croup.Often mis-
taken for
an exfolia-
tion of
mucous
membrane.How dif-
fers.

Illustrated

* See Med. Chir. Trans., vol. xiii.

† Edinb. Med. Essays, vol. v. p. 153.

GEN. VIII.
SPEC. VII.
Diarrhœa
tubularis.

degree of chronic inflammation, and a forcible contraction of the sphincter on evacuations. She has already discharged this kind of effusion for six weeks, and in tubes so perfect, as at first to have excited no small alarm in the attendants who noticed it. It is now, in some degree, on the decline both in quantity and tenacity.

Other
examples.

M. Bauer, in his letter to M. de Hahn*, gives similar examples; and a like case is described by Spindler, in which the secretion was worked up into a "*materia alba, longa, compacta.*†" It has sometimes assumed the exact shape of the intestine, as though this had cast off a tunic.‡

Discharge
in most
cases from
the large
intestines.

I have said, that the discharge in this species proceeds chiefly from the large intestines; and I have seen it so often as to have had sufficient opportunity of determining with tolerable accuracy the part of the canal affected. From a valuable article, however, of Dr. Powell's§, it appears at times to take place in the narrower portion of the intestinal tube, as high up, indeed, as the duodenum; for we are told, that it was accompanied with acute pain in the epigastric region; that the stomach was highly irritable; and that it was followed by symptoms of jaundice or obstructed bile.

From a small increase in the pulse, and a coating on the tongue, there seems to have been here also a slight degree of inflammatory action, though so inconsiderable that Dr. Powell questions whether there was any whatever; but adds, which my own experience leads me most fully to confirm, that the disease is certainly not "disposed to assume that peculiar irritative quickness of pulse which marks enteritis."

That the affection described by Dr. Powell belongs to the present species, will appear evident from his description of the material evacuated, which seemed "to have formed parts of an extensive adventitious membrane of no great tenacity or firmness."

The secre-
tion some-
times very
abundant.

"In the first of the cases," he adds, "which came under my notice, this membrane was passed in perfect tubes, some of them full half a yard in length; and certainly sufficient in quantity to have lined the whole intestinal canal. In others, also, the aggregate quantity has been very large, and it has continued to come away for many days, but it has been in thin irregular flakes, of not more than two inches' extent, and not, as far as I could discover, of the perfect tubular form." And he afterwards compares the membranous material thus excreted to that "formed in the trachea, under croup; but the symptoms," says he, "are there more violent and destructive from locality of situation."

Has been
mistaken
for cholo-
lithus.

From the acute degree of pain, which the disease thus situated produced, and must necessarily produce, in the smaller intestines, as also from the spasmodic constriction of the bile-ducts, and the common symptoms of jaundice, the passage of gall-stones was at first suspected, till the character of the intestinal discharge spoke for itself.

A like se-
cretion has
occurred in
the uterus.

From a like effusion of fibrin in the uterus, Blumenbach has shown, that a tunica decidua has been occasionally produced

* De Morb. Intest. Dresd. 1747.

† Obs. 45.

‡ Act. Nat. Cur., vol. v. Obs. 126.

§ Med. Trans., vol. vi. art. vii.

through the excitement of an aphrodisiac passion alone, without copulation or impregnation*; and Morgagni has given examples of so perfect a formation of the same membrane by the irritation that takes place in painful menstruation (*paramenia difficilis*), as to render it difficult to be distinguished from that belonging to an ovum.† So corpora lutea have been formed, and their cicatrices occasionally found, in the ovaries of virgins.

The milder preparations of mercury, employed as alterants rather than aperients, have frequently proved serviceable; and the balsam of copaiba still more so. The last is indeed generally useful in a chronic inflammation or irritable condition of the secernents of mucous membranes; and in the disease before us, where I have not been able to induce the patient to take it by the mouth, I have recommended it in the form of injections. In one case in which I prescribed it in this form, three drachms, intermixed with three ounces of mucilage of linseed, being thrown up three times a day, it proved eminently useful.

Common emollient injections, moreover, employed in much larger quantities, where the sphincter will allow the pipe to pass up, afford temporary ease; and a diluent and anodyne injection of warm water and laudanum alone, repeated twice a-day, still more benefit. In the mean while, the mercurial preparations just adverted to, and especially the blue pill, or Plummer's, which is still better (the pil. hydrarg. submur. comp. of the London College), should be taken in a dose of four or five grains every night: and, if necessary, the bowels kept open by two drachms of sublimed sulphur daily.‡

GEN. VIII.
SPEC. VII.
Diarrhœa
tubularis.

Medical
treatment.
Alterants.
Balsam of
copaiba.

Copious
emollient
injections.

Blue
pill, or
Plummer's.

* Comment. Soc. Reg. Scientiæ Götting. vol. ix.

† De Sed. et Caus. Morb. Ep. xlviii. 12.

‡ Sauvages has mentioned a *diarrhœa adiposa*, in which liquid or solid fat is discharged from the intestines. On this subject the most instructive document is a paper inserted by Professor Elliotson in the last volume of the Transactions of the Medical and Chirurgical Society of London, entitled "Observations on the Discharge of Fatty Matters from the Alimentary Canal and Urinary Passages." This paper contains, indeed, all that is known on the curious topic to which it relates. Dr. Elliotson begins his remarks by adverting to the formation of ambergris, or grey amber, a fatty substance, consisting chiefly of what is termed ambreine, which is analogous to chlosterine, and supposed to be produced by disease in the alimentary canal of the spermaceti whale (*physeter macrocephalus*). Some declare that this fatty substance is never seen higher than six or seven feet from the anus, and a mass weighing 182 pounds has been found in the animal. (Phil. Trans. 1783.) Dr. Elliotson next remarks, that fatty matters, which have an external origin, are occasionally discharged from the human alimentary canal, and that castor oil is frequently seen liquid in the evacuations. (See Riverii Obs. Med. Cent. ii. Obs. 23., and the German Ephem.) But old authors detail instances of fatty discharges from the intestines, that do not appear to have originated externally; "and (says Dr. Elliotson) of every variety of those old cases I can adduce a modern and indisputable example. In some instances the fat was discharged solid." In a case, related by Moellenbroccus, it was not unlike the fat of beef; and in another, recorded by Mæbius, a daily discharge of a substance exactly like human fat occurred. Amongst other examples, Dr. Elliotson refers to a weaver, whose case is detailed in the Medical Essays for 1752. The matter, voided with his excrement, was a whitish substance, about the bulk of a large walnut, and like tallow or hardened marrow, composed of small globules. For various other instances on record of the evacuation of solid fat, the editor refers to Dr. Elliotson's paper. On other occasions the fat is discharged liquid, and then concretes into the appearance of butter. The learned Professor of Physic in the London University quotes a case of this description from Tulpus. (Obs.

GENUS IX.

CHOLERA.

VOMITING AND PURGING.

ANXIETY, GRIPINGS, SPASMS IN THE LEGS AND ARMS; WITH VOMITING AND PURGING; OR FLATULENT ERUCTATIONS AND DEJECTIONS.*

GEN. IX.
Distin-
guished
from diar-
rhœa and
vomitus.

CHOLERA has, by several late and present writers of distinction, been regarded as a mere species of some other genus, as DIARRHŒA, which is the view taken of it by Dr. Young; or as a mere variety of some particular species, as *vomitus*, which is the place it holds

* Dr. Brown thinks the following definition, which is a modification of that of Dr. Macann, will probably comprise every case really belonging to the genus cholera: — "Vomiting, purging, spasms, prostration, and collapse, or any form of these symptoms occurring simultaneously, or in a succession more or less rapid." Cyclop. of Pract. Med. art. CHOLERA. This opinion may be correct, especially if the species termed *wind cholera*, by Dr. Good, be put out of consideration. — ED.

Med. Amst. 1685.) The yellow fatty substance, when thrown into the fire, burnt with a bright flame. He also reminds us of the specimen of such fat, preserved in the Museum of the College of Surgeons, and voided by a child four years and a half old. The case was related by Sir Everard Home, as a proof that fat is sometimes formed in the intestines. Dr. Elliotson met with two cases of fatty evacuations, and he has described the appearances found on dissection in these and another example. One patient, a weaver, aged forty-five, was admitted into St. Thomas's hospital, labouring under phthisis and diabetes mellitus. Soon after his admission, he complained of excruciating pain in the abdomen and in the back, and had diarrhœa. In his stools, which were often rather pale, a yellow substance was noticed, like concrete oil. On putting it into the fire, it burnt with a large flame. He continued to discharge more or less of this till his death. Long before, his urine became excessive; it seems that he had voided blood from his bowels, and that as soon as a matter like butter began to pass, the bleeding ceased and pain commenced. The fatty substance was examined by Dr. Prout and Mr. Faraday, who were satisfied of its oily nature. At length, the patient grew thin and weak from the combined effects of ulceration of the lungs, the discharge of sugar from the urinary organs, great suffering, and the discharge of fat from the bowels. On examination after death, all the intestines looked yellow and greasy, as though they had been soaked in oil. Numerous black points were seen in some parts of their mucous membrane, like those frequently noticed after fever and chronic diarrhœa. But no other morbid appearances existed in the alimentary canal. The liver was healthy, and the gall bladder full of thick, dark bile. The pancreatic duct and the larger lateral branches were crammed with white calculi. The kidneys were sound; the lungs tuberculated and ulcerated.

Dr. Elliotson was shown, by Mr. Pearson of Clapham, a woman who voided both solid and liquid fat. She died of this complaint and phthisis. Her liver was enlarged and painful; her urine scanty and pale; she was generally relaxed, and the evacuations preceded by pain. For many months she vomited several times a day. The feces were very pale, and almost destitute of smell. She passed daily about two ounces and a half of fat, and a third of an ounce of oil; but the quantity of the latter varied considerably. After death no disease was discernible in the alimentary canal or urinary organs. The liver was healthy in structure, but very large and pale, destitute of bile, no less than the gall bladder, which contained a thick, greasy mucus, not inflammable. In one case, com-

in Dr. Parr's nosology. It is not always, however, accompanied with a diarrhœa; and, even where it is so, the constant tendency it evinces to an extensive chain of spasmodic actions, gives a striking character to the disease, and justifies its being arranged and treated of as a distinct genus. From vomitus, it is still more widely discrepant.

The term CHOLERA is of ancient use, for we trace it in the writings of Hippocrates. Celsus derives it from *χολη* and *ῥεω*, literally *bile flux*; and Trallian from *χολας* and *ῥεω*, literally *intestinal flux*, as though the matter discharged from the alimentary canal were excerned by the intestines rather than by the liver. It is highly probable, that, in all its species, we shall to have to contemplate the liver as morbidly affected from the commencement, and the bile as some way or other damaged in its secretion, yet not always by too rapid and copious a flow, to which the disease has been generally referred. This, indeed, will be found ordinarily to take place in the first of the three following species; but, in the second, it appears to be injured by suppression rather than by excess; and in the third, by a change in its natural qualities, if, indeed, much of the fluid discharged in this species be not, as suspected by Trallian,

GEN. IX.
Cholera.

Origin of
the generic
term.

Character-
ised by mor-
bid flux of
bile rather
than uni-
formly by
increased
flux.

municated to Dr. Elliotson by Dr. Prout, the cæcum was found much thickened, and the mucous membrane of it and the colon ulcerated.

Dr. Elliotson afterwards quotes an example from Tulpius, in which fat was voided both from the bowels and bladder, a modern case of which he has also adduced in a lady of his acquaintance. It seems that Dr. Prout has several times noticed fatty matter, that had been passed with the urine, and, in every instance, malignant disease of the kidney and bladder supervened.

"I have thus (says Dr. Elliotson) not merely adduced recent examples of all the old wonderful cases of this kind, and even one example of the most wonderful, in which oil passed from both the intestines and bladder; but have related one more extraordinary than any, in which, while *pus*, a substance not found in the healthy body, was passing from the air passages, *oil* was passing from the intestines, and *sugar* from the urinary organs.

"It also appears that organic disease of neither the alimentary canal nor any other part is necessary to the disease, though, in all the cases that have proved *fatal*, and been investigated, there have been found marks of disease in either the alimentary canal, the liver, or the pancreas; and, in many, decided disturbance of the liver occurred during life. The affection, accordingly, has sometimes been temporary, sometimes occasional; sometimes accompanied by various incidental symptoms; sometimes unattended by severe consequences, and sometimes has proved fatal: agreeing in these points with so many other diseases.

"It may be a question whether the fatty discharges from the bowels were derived from the liver or the intestines. The pain at the epigastrium and right hypochondrium experienced in some cases, the jaundice sometimes noticed, the total deficiency of bile in the motions of some of the patients, and the unctuous nature of most biliary concretions, together with the natural presence of unctuous substances in the bile, may favour the opinion of their hepatic origin. I am at a loss to say whether the completely oily appearance of the coats of the intestines, in the man whom I opened, favours the opinion of their intestinal origin. If this is their source, I am at a loss to which portion of the tube to ascribe them.

"In regard to treatment, the lady mentioned by Dr. Babington was always relieved almost at once by a few ounces of olive oil, and Dr. Simpson appears to have cured two cases by the exhibition of an immense dose of it. In imitation of this practice, I gave my patient two ounces of olive oil for two successive days, and four ounces on the third, which, however, he made two doses of, with the effect of vomiting and purging; and he certainly from that time discharged much less of the oily matter, and suffered much less pain in the abdomen and back."

See Med. Chir. Trans., vol. xix.—ED.

GEN. IX.
Cholera.

in some instances, secreted by the excretories of the intestines.* Under either derivation, however, the term is not incorrect; for the alimentary canal and the liver uniformly co-operate in the morbid action, and the fluid discharged is the result of such concurrence.

Sometimes,
but im-
properly,
called
cholera
morbus.

Some writers formerly, and many in the present day, have expressed this disease by the pleonastic term of cholera morbus; pretending that cholera, of itself, imports *anger* as well as the disease before us, and that *morbus* is added to distinguish between the two. I am not aware, that the word cholera has ever been employed in a mental sense by any Greek writer, though several of its co-derivatives have been. It stands alone in Celsus and Galen; and if a distinctive adjunct were not necessary in their days, it must be wholly superfluous in ours. The following are the species that seem clearly to belong to this genus:—

- | | |
|---------------------|---------------------|
| 1. CHOLERA BILIOSA. | BILIOUS CHOLERA. |
| 2. ——— FLATULENTA. | WIND CHOLERA. |
| 3. ——— SPASMODIC. | SPASMODIC CHOLERA.† |

SPECIES I.

CHOLERA BILIOSA.

BILIOUS CHOLERA.

THE VOMITING AND PURGING FREQUENT AND COPIOUS, WITH A
REDUNDANCY OF BILE.‡

GEN. IX.
SPEC. I.

Both sporadic and epidemic.

Mildest under the first mode.

THIS species is both sporadic and epidemic. Under the first form it is usually of slighter and shorter duration; and its common causes are, superabundant and perhaps acrid bile; suppressed perspiration, particularly by cold or damp applied to the feet, as in standing long on a moist soil in foggy weather; cold drinks, especially when the body is considerably heated by exercise; cold, indigestible fruits, as unripe apples or pears, cucumbers, melons, mushrooms; drastic purges taken in excess; and in one instance an excessive dose of

* In the spasmodic or malignant cholera here alluded to, the motions have no bile in them whatever, and are perfectly white and watery. — ED.

† For practical purposes, the division into ordinary cholera, and spasmodic or malignant cholera, is sometimes deemed sufficient. — ED.

‡ “Ordinary cholera may be thus defined:—Vomiting and purging, the discharges during the greater part of the disease containing generally a large proportion of bile; pain in the stomach and intestines; spasms, especially of the muscles of the abdomen and lower extremities, and prostration. If collapse occur, it takes place after the disease has endured some time, apparently as an effect of the great discharge, spasms, and irritation.” (Dr. Brown, in Cyclop. of Pract. Med.) Professor Elliotson’s description runs thus:—“At last, however, from the violent pain and profuse discharge, the body becomes cold, great faintness is felt, perhaps there is actual syncope; the patient sinks, becomes excessively weak, and then every thing occurs exactly as if hemorrhage had taken place. General convulsions occur, the spasm ceases, and the patient dies as if he had lost an immense quantity of blood.” (Med. Gaz. for 1832-3, p. 600.) — ED.

emetic tartar*; a sudden fright, and particularly from thunder†, or any other rapid exhaustion of the sensorial power.

The causes are, therefore, many of them the same as those that produce several of the species of diarrhœa and colic; particularly *colica cibaria*, or surfeit. Sydenham, indeed observes, that the symptoms of the last and of cholera are alike, and the cure the same; yet adds that the diseases are of a different kind. In effect, the last is peculiarly distinguished by its wandering, or universal spasticity; and hence becomes a far more dangerous, because a far more general affection.

The epidemic form of the disease shows itself commonly at the close of summer, or the beginning of autumn—Sydenham says, as certainly as the appearance of swallows in the spring, or cuckoos about the dog-days; [and that it very seldom continues longer than the month in which it began. But, this observation does not accord with the experience of the present times. Cholera is now seen perhaps more frequently in September than in August; and cases sometimes occur, though it be not epidemic, considerably earlier than August; even in June, or May.‡] One of the immediate effects of the calorific rays of the sun is to stimulate the liver to excessive secretion of bile; hence the alimentary canal is overloaded with it.§ And hence, again, the greater violence of this complaint, and its accompaniment with peculiar symptoms in hot climates. In addition to this cause, however, which operates directly upon the body, there is another which operates indirectly upon the body, and directly upon the atmosphere; and that is, the ascent of an unhealthy effluvium from the decomposition of animal and vegetable substances that form the face of swamps, marshes, and other moist grounds; which predisposes the body to the action of this and other diseases as well: unless it be conceived, that the particular epidemy results from a peculiar combination of the decomposing elements, so as to produce a choleric miasm, as, under another combination, they produce a febrile miasm; a subject well worthy of consideration as it relates to the third species of cholera.

It is not to be wondered at, therefore, that this disease should, in many instances, prove excessively severe. Its symptoms, indeed, are often dreadfully violent and rapidly fatal, as may be seen from Dr. Sydenham's description, which is as follows: Vehement vomit-

GEN. IX.

SPEC. I.

Cholera biliosa.

Causes.

How far related to choleric.

Epidemic form; its chief season.

Why principally in the autumn.

Whether a choleric as well as a febrile miasm.

Often severe, and rapidly fatal.

* Henrici Dissert. de Cholera Morbo, Hal. 1740.

† Phil. Trans. 1667. Henrici Diss. supra cit.

‡ Bateman, in Rees's Cyclopædia, art. CHOLERA.

§ Medical writers disagree on the question, whether in this form of cholera the liver is the part first disordered, or the alimentary canal primarily, and the liver secondarily. Dr. Brown considers the first effect of the application of the cause of cholera to be a violent irritation of the mucous lining of the stomach and small intestines, which is then propagated to the liver. (Cyclop. of Pract. Med.) This view seems to him to be more in accordance with the agency of the usually assigned causes of the disease, with its phenomena, the effects of remedies upon it, and the appearances on dissection. From the latter, perhaps, no inference can usually be drawn; for, as Andral observes, " Dans cette maladie, où les accidens terribles, qui surviennent du côté des voies digestives sembleraient se lier à des lésions intenses du canal intestinal, on ne trouve autre chose dans ce canal qu'une injection plus ou moins vive, qui ne diffère pas de celle qu'on rencontre, sur beaucoup d'autres cadavres, dans des cas où pendant la vie n'a même existé aucune affection grave de l'estomac ou des intestins." (Précis d'Anat. Pathol. t. ii. p. 207.)—ED.

GEN. IX.

SPEC. I.
Cholera
biliosa.

General
character as
described
by Syden-
ham.

Nature of
the dis-
charge as
described
by Celsus.

Medical
treatment.

First inten-
tion.

Diluents
and demul-
cents rather
than stimu-
lants.

Water cold
or nearly so.

Oat-bread
toast and
water.

ings, and difficult and painful dejections of ill-conditioned fluids; agony, and inflammation of the intestines and abdomen, cardialgia, thirst, a quick pulse, often small and unequal, heat and anxiety, nausea and colliquative sweat, spasms of the arms and legs, fainting, coldness of the extremities, and other symptoms, of equal danger, which terrify the bystanders, and kill the patient in twenty-four hours.*

Celsus, who has entered with more minuteness than is common to him into the diagnostics of this species, explains, more fully than Sydenham has done, the exact nature and appearance of the ill-conditioned discharges to which the latter refers. "*Bilis supra infraque erumpit, primum aquæ similis, deinde ut in eâ recens carolota esse videatur, interdum alba, nonnunquam nigra, vel varia.*†" "The bile bursts forth both upwards and downwards; at first like water, afterwards as though fresh flesh had been washed in it; sometimes white, sometimes black or variegated." And he adds, accordantly with Sydenham "*quibus concurrentibus, non mirum est, si subito quis moriatur.*" "All these symptoms associating, it is not to be wondered at that the patient should die suddenly.‡"

As the general commotion of the alimentary canal is to be referred in this species to a superabundance of bile thrown into it, and probably possessing a peculiar acrimony, our first object in attempting a cure should be, not to excite an additional flow by stimulants of any kind, and especially by violent purgatives and emetics, but to dilute and wash it out of the stomach and intestines by a free exhibition of mild demulcent fluids, as well injected by the anus as given by the mouth. And when this has been accomplished, the spasmodic action of whatever parts are affected may be advantageously attacked with opiates. This was Sydenham's practice, and it cannot well be improved upon.

Those diluents and demulcents are to be preferred which agree best with the stomach, and sit easiest and longest upon it. Celsus recommends a free use of water not quite cold, but only just deprived of its chill; "*aqua, neque ea ipsa frigida, sed potius egelida, danda est.*"§ Lienard, half a century before the time of Sydenham, gave it cold and fresh from the fountain, and, as he assures us, with great success.|| And Cleghorn has recommended the same practice even in hot climates in our own times. Dr. Douglas was peculiarly attached to toast and water, which he made with oat-bread boiled in the water; the bread so thoroughly toasted, that the decoction was as brown as coffee. This has a slight astringency and a little mucilage, and may be a useful diluent. Dr. Douglas declares that

* Sect. iv. chap. ii. As also *Epist. de Morb. Epidem. 1675—1680*. At first, the discharge is sometimes thin and watery, and then the complaint has been called *white vomit*, but very soon pure bile comes away. (Elliotson, *op. cit.*) The following description of certain serious symptoms, by Dr. Brown, is very correct: — "At the commencement of the attack the skin is generally warm and dry, but, after a few hours, its temperature falls considerably below the standard of health, and it is bedewed with a cold and clammy moisture. The tongue is dry, and the thirst excessive; the urine scanty, and high coloured; the pulse rapid, and generally small and irregular; and the spasms, which affect the muscles of the abdomen and of the inferior extremities, and occasionally those of the hands and arms, recur at short intervals, and are attended with great pain." — Ed.

† *Medicin. lib. iv. sect. xi.*

‡ *Loco citat.*

§ *Loco supra citat.*

|| *Dissert. Ergo Cholerae Morbo Frigidus Potus? Paris, 1626.*

he never knew it rejected in any case of cholera. Infusion of spear-mint proves, also, a good anti-emetic, but it should be made with leaves fresh from the garden. Sydenham prescribed weak chicken-broth for the same purpose, and applied it by injection to the rectum, as well as to the stomach. Linseed-tea or barley-water, with a little gum-acacia dissolved in it, may answer as well. As soon as the alimentary canal has been thus cleared of acrimonious matter, and the sickness subsides, opium, with or without relaxants, should be administered in repeated doses, to subdue the spasmodic action. Sydenham employed it alone, and in his favourite form of liquid laudanum, varying the dose from twelve to twenty drops in mint-water. Dr. Fordyce, with still more judgment, united it with small doses of antimonials, and thus increased its relaxant power.

But if the onset of the disease be very violent, and the pulse and the general health sink rapidly, opium must be given, and very freely, from the commencement.* Cholera is in all cases a very acute disease, and of short duration. I have already observed that it has destroyed in twenty-four hours.† The symptoms generally abate on the second or third day, and the patient recovers rapidly. If there be any considerable degree of weakness on the decline of the disease, it may be necessary to have recourse to the warm and bitter tonics, of which calumbo will be found one of the best.

[The following mixture is strongly recommended by Mr. Hope‡, of Chatham, for its efficacy in cholera:—℞ Acid. Nitrosi ʒi. Mist. Camph. ʒviiij. Misce et adde Tinct. Opii. xl. One fourth part to be taken every three or four hours.]

GEN. IX.
SPEC. I.
Cholera
biliosa.

Mint-tea
from the
fresh plant.

Opium,

with anti-
imonials.

When
acute,
opium from
the first.

Warm and
bitter
tonics.

* Dr. Elliotson joins with the diluent plan large doses of opium, and, in cases of extreme weakness, approves of brandy or other stimuli, and the hot bath. When the disease consists chiefly of vomiting, he thinks it advisable to determine a part of the bile downwards with calomel. If, after a time, a congestion of the head or any inflammation occur, the treatment must be regulated accordingly. (Med. Gaz. for 1832-3, p. 600.) Dr. Brown is also an advocate for not deferring the administration of opium, which, in severe cases, he joins with calomel. (Cyclop. of Pract. Med.) In slight examples, he gives a grain of opium, or a proportionate dose of laudanum, every second hour, till relief be obtained. In those which are more severe, he prescribes two or three grains of calomel, with a grain of opium at the same interval, till three or four doses have been taken. Or, the calomel being administered in a pill, a draught, containing a proportion of laudanum, or black drop, equivalent to a grain of opium, may be taken along with it. If gastro-enteritis should come on, leeches and blisters on the abdomen, and three or four grains of the hydrarg. cum creta, every fourth hour, till some affection of the mouth is perceived, are the remedies preferred.—ED.

† This affection may last only a few hours, seizing the patient, for instance, early in the morning, and proving fatal in the middle of the day. Or, it may last many days; and if it subside, it may probably be followed by inflammation. Dr. Elliotson has frequently seen gastro-enteritis take place, after the discharge had entirely ceased. See Lect. in Med. Gaz. for 1832-3, p. 600.—ED.

‡ See Edinb. Med. and Surgical Journ. No. 88. p. 39.

SPECIES II.

CHOLERA FLATULENTA.

WIND CHOLERA.

THE VOMITING AND PURGING RARE, OR ABSENT; GREAT AND OPPRESSIVE FLATULENCE; RETCHING; FLATULENT DEJECTIONS AND ERUCTATIONS.

GEN. IX. THIS species I have continued from Hippocrates, who denominates it, from the absence of liquid discharges, cholera ξηρή, as Sydenham, SPEC. II. by translating the Greek term, has done, *cholera sicca*.*

The cholera sicca of Hippocrates and Sydenham.

General character and predisposing causes.

Flatulency whence derived.

Constitutions chiefly liable to it.

The disease not common:

whence rejected by Cullen from his classification: and by others ranked with colic; but improperly.

Occasional causes.

Curative process.

In this species, the bile, instead of being excessive in its flow, is obstructed or diminished in its quantity, and perhaps secreted with too low instead of too high a degree of pungency. The liver is evidently torpid and enfeebled; and as flatulency is always a sign of debility, we have a full proof that the stomach and intestinal canal are in the same state. We have here, therefore, cholera grafted upon a dyspeptic habit; and as, in dyspepsy, some quantity of air is let loose from most foods, whether solid or liquid, and an immense portion from many kinds, we are at no loss to account for the flatulency. The absence of evacuations is partly from spasmodic constriction, and partly from a want of wholesome bile; and the retching does not pass into vomiting, because the diaphragm, on whose expulsive cooperation the action of vomiting chiefly depends, forms a link in the entastic chain, as is obvious from the increased anxiety of the præcordia.

When cholera, therefore, is an epidemic malady, it will show itself under this form in persons of a highly dyspeptic idiosyncrasy, still more generally than when it appears as a sporadic disease. But the form is not a common one: and hence in the epidemic cholera of 1669, Sydenham declares, that he met with not more than a single instance of it: "unicum," says he, "duntaxat exemplum me vidisse memini ineunte hujus anni autumnus."* And on this account Dr. Cullen has rejected the species altogether; as others have transferred it to the genus Colica. But as the disease does exist, though it does not occur often, and as the distinguished symptoms of anxiety and spasms of the extremities, which peculiarly draw the line between cholera and colic, are equally present in this and the other species, we cannot disjoin them without confusion. They are produced by the same occasional causes, as surfeit, cold drinks upon a heated body, cold vegetables, as melons, inedible fungi mistaken for esculent mushrooms, poisonous animal and mineral substances; they all take place sporadically, and all are at times epidemic.

The cure should be commenced with warm cathartics alone, or intermixed with opium, as the compound tincture of rhubarb, or of

* Sect. iv. cap. ii.

aloes. Usquebaugh, or the tincture of capsicum, has often also been found useful: and when the paroxysm is removed, the restorative plan should be pursued, which has been already recommended for dyspepsy.

GEN. IX.
SPEC. II.
Cholera
flatulenta.

SPECIES III.

CHOLERA SPASMODICA.

SPASMODIC CHOLERA.

BURNING PAIN IN THE EPIGASTRIC REGION; THE DEJECTIONS WATERY; INEFFECTUAL RETCHINGS, OR VOMITINGS OF A WHITISH FLUID; SPASMS SUCCESSIVE AND VIOLENT, OFTEN EXTENDING TO EVERY ORGAN; BLOOD DRAWN FROM THE ARM BLACK AND VISCID: GREAT DESPONDENCY AND PROSTRATION OF STRENGTH.

THERE is no species of disease that has of late years attracted more, perhaps none so much, attention, both at home and in the East, as the fatal cholera we are now about to consider.

GEN. IX.
SPEC. III.

We dare not say, that it is an epidemic of modern origin, since it seems to be described by Bontius, and is supposed by some writers to be glanced at by several Greek physicians, and even by Celsus. [Independently of the early notices left us by Bontius, and the more recent ones by Dellon*, in 1689, by Curtis and Paisley in 1774, and by Sonnerat from 1774 to 1781, Mr. Scott† endeavours to prove, that it was described by the medical writers of the Hindoos, and particularly in a work ascribed to Dhanwantari, a mythological personage, corresponding to the Greek Esculapius. He also informs us, that an epidemic prevailed at Arcot and other places about 1781, the occurrence of which was entered in the proceedings of the Madras Medical Board on the 29th of November 1787, in the following terms:—"A disease having in October last prevailed in Arcot, similar to an endemic that raged among the natives about Paliconda in the Ambore Valley in 1769—1770, in an army of observation in January, 1783, and in the Bengal detachment at Ganjam in 1781, &c., as well as to an epidemic over the whole coast in 1783, under the appearance of dysentery, cholera morbus, or *mordyxim*, but attended with spasms at the præcordia, and sudden prostration of strength, as characteristic marks," &c. Mr. Scott adverts also to the occurrence of cholera in the Mauritius in 1778, and again in 1819; at Madras in 1782; at Vellore in 1787; at Arcot in the same year; in the northern

How far an
epidemy of
modern
origin.

* Voyage aux Indes Orientales. Amsterd. 1689. It was intimated to Dr. Good, by the Army Medical Board, that, in a few official documents at the East India house, which were re-examined, the present disease is distinctly referred to, as having existed in the Bengal territory about a century ago, which will bring it only a little below the time when Dellon published his statement, and consequently give it confirmation.

† Report on the Epidemic Cholera, &c. by W. Scott, fol., Madras, 1824.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Circars in 1790; and in the vicinity of Trincomallee about 1804. Some fatal cases are also reported to have occurred at Jaulnah in 1814.] The subject, however, is yet unsettled; and Mr. Annesley will not allow that the disease alluded to by Bontius, and still more lately by Sonnerat, is the exact disease before us.* But we may at least affirm, that it has of late years assumed an activity, fatality, and extent of range, that it does not seem, from any history that has descended to us, to have possessed in earlier times; and that cannot be contemplated without horror: on which account, it has been compared by Mr. Orton to the sweating sickness, and various other pestilences, that, with great fury and mortality, have ravaged the world in former periods.†

Whether
noticed by
Sydenham;

Some of the cases that occurred to Sydenham in the first species of cholera, and which we have already noticed, were so rapidly fatal, that this distinguished pathologist has also been conceived to have been acquainted with the present species, and to have included it under them. But his description does not seem to warrant any such conclusion; [for, he says, it prevails at the end of summer, and during the autumn, as regularly as vegetation comes in spring; whereas this disease occurs at all seasons, and has no connection whatever with heat. Sydenham describes it as a discharge of bile, and not of the peculiar fluid which we see in this affection.‡] Dr. Cullen, in like manner, upon a cursory view, might appear to have had his eye directed to it; for he has loosely copied Sydenham's remark, that cholera is sometimes so severe in its symptoms as to destroy life in twenty-four hours. But, on a more attentive survey, it will be perfectly clear, that Dr Cullen does not even, under this character, refer to the species before us; for he considers an increased secretion and discharge of common or yellow bile as a symptom belonging to every species of the genus; and contends that those cases, which have not this mark, are samples of diarrhœa, or some other disorder, but do not appertain to cholera.

or by
Cullen.

The de-
scription of
the last does
not apply to
it.

Not noticed
by Sau-
vages.

Sauvages seems to have regarded cholera in all its species as a less momentous disease than even Cullen; for, though he professes to follow Sydenham altogether in the mode of treatment, he takes no notice whatever of Sydenham's remark, that its symptoms are sometimes so violent as to destroy life in twenty-four hours. He has given, indeed, from Dellon, a species which he calls *cholera Indica*, but which differs very materially from the present, in being distinguished by delirium, a *strong* though unequal pulse, and a free flow of urine, both red and white, yet always limpid; as though the complaint were accompanied with inflammatory fever.

[It was from India and the adjoining countries, that the first clear and faithful descriptions of this species of cholera reached us; and, even before the disorder had extended to Europe, the British practitioners in Asia had favoured us with so extensive a mass of communications that we were already in possession of a tolerably correct history of the general nature of the disease, how ignorant soever we might then be, and still are, of its remote cause; and Professor Cruveilhier pays a very handsome and well-merited compliment to

* Sketches of the most prominent Diseases in India, &c. 8vo. Lond. 1825.

† Essay on the Epidemic Cholera of India, passim, 2 vols. 8vo. Madras, 1820.

‡ See Professor Elliotson's Lectures in Med. Gaz. for 1832-3, p. 628.

our countrymen in India, when he states, that the observations subsequently collected at Moscow, Warsaw, Vienna, Berlin, London, and Paris, have only confirmed, or exhibited under new forms, the facts recorded in the modest accounts drawn up by our medical brethren at Calcutta. Not the slightest doubt, then, can be entertained of the absolute identity of the Indian and European cholera: hence, their dependence upon some common, grave, and powerful cause, which overcomes all the circumstances of race, climate, temperature, season, and social customs; hence also the suspicion that the disorder was imported into Europe by the Russian army in its invasion of Poland.*]

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Among those who seem distinctly to have noticed it, though in a cursory way, are Sonnerat and Bartolomeo; the first of whom tells us, that it is called by the natives *mordezym*, a term which, according to Bartolomeo, Sonnerat has transformed, rather than translated, into *mort de chien*; but which I am more disposed to think is a corruption of the Arabic MORDEKIE or MORDECHIE (مردك), the very name by which Dellon says the natives denominated it, and which significantly imports "the death-blow:" according to Golius, *actio inferens mortem*; and hence synonymous with موت علي "mors repentina," or موت غصيب "mors violenta."

By whom
chiefly
noticed.

Why called
mort de
chien.

By the name of *mort de chien*, however, in what way soever derived, it is, according to Mr. Curtis†, most generally known in the present day, and particularly at Madras; and under this name, therefore, he has described it. To this gentleman we are indebted for one of the earliest histories of the disease that within the last fourteen or fifteen years have reached our own country; and which, added to Dr. Girdlestone's statement‡, began first of all to draw the attention of British practitioners to its truly formidable character.

Mr. Curtis, whose history was published in 1807, regarded it, at that time, as a new disease; and, finding no name for it in the nomenclological classifications, proposed, from its leading symptoms, to call it SPASMODIC CHOLERA; and it is thus denominated in the present work. From the absence of yellow bile, and perhaps of bile of any kind, by which the disorder is peculiarly distinguished, some of the writers in India have objected to the term cholera, as conceiving that such a term necessarily imports a redundancy of this fluid, and that, too, of its natural colour, and other qualities; yet, as I have already had occasion to show, there is no such necessity whatever imposed on the term, but merely an understanding that the bile is morbidly affected in its secretion, either in quantity or quality of any kind, and consequently there is no reason for changing the term on this ground.§ Nor are there always spasms in

By whom
named
spasmodic
cholera.

Name
justified.

* See Anat. Pathol. 14me Livr. Paris, 1830.

† An Account of the Diseases of India, as they appeared in the English Fleet, and in the naval Hospital at Madras, in 1782, 1783, &c. Edin. 1807.

‡ Essay on Hepatitis and the Spasmodic Affections of India. Lond. 1787.

§ At the present day, many practitioners object to the name for a reason which our author has not considered. Certainly, if only one stage of the disease were regarded, in which vomiting, purging, spasms, and prostration take place, the pathognomonic symptoms of cholera, the term *spasmodic cholera* would seem allowable; but, as Dr. Brown argues, "when it is remembered that the choleric symptoms, if not fatal, prove but the commencement of a series of changes, to which any one, who witnessed them alone, would give the appellation of *fever*, and

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Descrip-
tion given
by Curtis.

Proof of
greater
severity in
recent
times.

Cholera of
1817.

any part of the body; for the disease, at least as it has of late shown itself, in some cases destroys instantaneously, and before it has assumed its regular character; but I do not remember to have met with a single instance of its having run on for twelve hours, without having developed this essential symptom.

Mr. Curtis informs us, that soon after the attack "the spasms began to affect the muscles of the thighs, abdomen, and thorax, and lastly passed to those of the arms, hands, and fingers; but I never," says he, "then or afterwards saw those of the neck, face, or back at all affected. The rapidity with which these spasms succeeded the attack, and their severity, especially as affecting the muscles of the thorax and abdomen, denoted in general the degree of danger in the case. The affection is a fixed cramp in the belly of the muscle, which is gathered into a hard knot with excruciating pain. In a minute or two this relaxes; is again renewed, or the affection passes to others; leaving the miserable sufferer hardly an interval of ease; and, lastly, it passes from one set to another, leaving the former free."

This account is supported by Dr. Johnson in his valuable "Essay on the Influence of Tropical Climates:" yet, as a proof that the Eastern cholera has of late assumed a severer and more fatal character, it is only necessary to observe, that the subsequent cramps, regarded by Mr. Curtis, and no doubt justly so, as indicative of the highest degree of danger, have, since the period to which his writings refer, been hailed as less ominous than many of the symptoms with which the disease now occasionally opens; and contemplated as a reaction of the system, struggling against the first shock; proving that it has not been totally and instantaneously exhausted of sensorial power, as a Leyden phial is exhausted of its electricity by the discharge of the brass rod when applied to it.

The later and more fatal ravage I am now referring to, commenced its attack in August, 1817, at Jessore, about a hundred miles to the north-east of Calcutta; and, spreading from village to

which men of great experience in the disease have declared they could not distinguish from typhus;—if we observe, too, that long before this epidemic excited attention, symptoms strikingly resembling those of cholera had been observed to form the initiatory stage of certain malignant fevers (see Dr. Negri's letter to Dr. Barry; Morton, *Pyretologia*, pp. 16. 13. 81.; Torti, *de Febribus*, lib. iii., p. 124.; and *Med. Essays*, by J. Brown, M. D., pp. 37—39.), we are disposed to admit that it is really a fever, and that to designate it merely cholera is to take a part for the whole," &c. (Dr. Brown in *Cycl. of Pract. Med.*) The name, which this gentleman prefers, is that suggested by Dr. Johnson, namely, *epidemic choleric fever*. On the other hand, it might be argued, that a consecutive fever is not invariable; and one remark made by Drs. Russell and Barry is, that such fever is of more frequent occurrence in Russia than India. In the cases which the editor has had opportunities of seeing, in the King's Bench and elsewhere, if the patients recovered from the stage of collapse, febrile symptoms always followed, though in very different degrees in different examples. This observation accords with the following statement:—"We can positively assert, that we have not met with a single case in England in which fever did not intervene between the choleric or cold stage and restoration to health; and the result of enquiries we have addressed to individuals the most observing, and most familiar with the disease in this country, has proved that their experience has coincided with our own. It is true that, in some cases, this fever has been slight, but the choleric stage has been so likewise; for we have always observed a correspondence in intensity between these stages." (Dr. Brown in *Cyclop. of Pract. Med.*) — Ed.

village, reached Calcutta early in September, having destroyed thousands of inhabitants in its course. From Calcutta it extended to Behar, depopulating many large cities, and compelling the residents to flee for safety to other spots. Benares, Allahabad, Goruckpore, Lucknow, Cawnpore, Delhi, Agra, Muttra, Meerat, and Barcilly, all suffered in succession; the pestilence not diffusing itself at once, but travelling by a chain of posts, and attacking a second district after it had ravaged a first.

At length it reached the grand army, and spread through its different divisions at Mundellah, Jubbulpore, and Saugor, marching in terrible array over the Deccan. At Hussingabad its havoc was dreadful for several days; when, taking a course along the banks of the Nerbuddah, it alighted at Tannah. Having visited the famous cities of Arungabad and Ahmednugger, it spread to Poonah, and, in the direction of the coast, to Panwell, where it ramified north and south, crossed Salsette, and arrived at Bombay in the second week of September, 1818, a twelvemonth after its appearance at Calcutta.

While this was passing in the west of the Peninsula, the epidemic was making a like progress to the east and south, progressively extending over the whole Coromandel coast: whence it was reported to have spread, and a report that afterwards proved to be but too true, to Ceylon; to the pure air and temperate climate of Siam; to Malacca; and, across the Straits of Sunda, to China; since which time it has reached the Mauritius; and made its appearance on board vessels both in harbour and at sea. [In the summer of 1821, the disease first commenced its ravages on the borders of the Persian Gulf, after having raged in the earlier months of that year at Bombay. In 1823, it had extended itself, in one direction, to the shores of the Caspian Sea, and, in another, as far as the Mediterranean, making an apparent stand at Astrachan, and in the neighbourhood of ancient Antioch.* At this period, therefore, it very closely threatened Europe. It had passed over 90° of longitude and 66° of latitude; having, in one direction, crossed the equator, and approached the boundary of the southern tropics; and, in another, traversed the northern tropic into the temperate zone.]

The diagnostics of this extraordinary pestilence are admirably furnished for the period before us, by Mr. Whyte, assistant-surgeon to one of the divisions of the army, whose description I shall copy; premising that, while in the centre division the spasms preceded the vomiting and purging, in the others they generally came on after the appearance of these symptoms.

The disease, says Mr. Whyte, commonly begins with a watery purging, unattended with griping or any pain. At an interval of, generally, from half an hour to five or six hours, and sometimes without any interval, the patient vomits a white fluid uncombined with bile. The spasms, in the division of the army from which

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Spreads
westward.

Spreads
eastward,

to the Mau-
ritius.

Descrip-
tion of the
disease by
Whyte.

* Dr. Rehman, in Hufeland's Journ. for June, 1824, or in Edinb. Med. and Surg. Journ. Nos. 82. and 83. In 1828 it reappeared at Orenburg, and in 1830 advanced through the southern provinces of Russia to Moscow. From Russia, it extended itself into Poland, Germany, Great Britain and Ireland, Holland, France, Portugal, and the New World. Its general course has been, therefore, towards the north-west, with occasional deviations from it. — ED.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

this description is drawn, made their attack at no determinate period of the disease; but, in general, not for many hours after the commencement of the vomiting and purging. There was soon great debility and sinking of the pulse; the extremities became cold; the eyes sunk in their sockets; the vessels of the tunica adnata were injected with red blood, over which, if the disease advanced, a film was formed; the features expressed the deepest anguish; and the eyelids were either wholly or half closed. The patient invariably complained of great heat at the stomach, and called incessantly for cold drink. The tenesmus now became violent, while nothing was discharged but the fluid just noticed, and a substance like the coagulated white of an egg. The uneasiness and jactitation were so great, that it was with the utmost difficulty an opportunity could be got of feeling the pulse, which by this time was not always perceptible, although it was generally so till the spasms came on. These were always of the rigid kind, attacking first the toes and legs, and then extending to the thighs, chest, and arms. When they reached the chest, the breathing became so difficult, and the sense of suffocation so extreme, that the diaphragm most probably associated in the spasmodic action. [In one case, mentioned by Mr. Scott, where a man had been paralytic in his limbs, with a total numbness of them, they were severely affected with spasms, and became exquisitely sensible.]

Symp-
toms most
dangerous.

The most unfavourable and dangerous signs in the ordinary progress of the disease were, a coldness of the surface, extending over the region of the heart and stomach. The skin, under the nails, became incurvated; the tongue was icy cold; a universal colliquative sweat broke forth, with a shrivelling of the palms of the hands and soles of the feet: the spasms gradually declining as these symptoms increased. In general, all pain and spasm left the patient before death; and even when the heart could not be felt to beat, he expressed himself easy, and said he was better. Sometimes, however, he was, at this period, in the greatest agony, rolling himself on the ground, groaning, and even bellowing most piteously; signs chiefly occurring in patients, who lingered three or four days before death came to their relief.

In this description the onset or invasion of the disease is hardly noticed with sufficient minuteness; and I readily supply the deficiency, in this edition, from my friend Mr. Annesley's admirable delineation:—"The patient feels for several hours, or for a greater or shorter period, according to circumstances, a sense of general uneasiness and anxiety about the epigastrium, with a feeling of heat in the same situation. These symptoms increase more or less rapidly; and the countenance, which at first is merely expressive of uneasiness, soon becomes more and more anxious and distressed. The pulse at this time is generally quickened and always oppressed. This state of the system forms the first stage of the disease; a stage which, from its importance in the treatment, I have called the stage of invasion."* Mr. Annesley's two most prominent symptoms, are the sense of heat, or burning pain, as he

* Sketches of the most prevalent Diseases of India, &c. By James Annesley. 8vo. Lond. 1825. The whole of this paragraph, in Dr. Good's handwriting, was lately found amongst his papers, with a reference to the part of this work in which he intended to have inserted it. — Ed.

afterwards calls it, in the epigastric region, which is generally felt before the vomiting and purging take place; and the black, thick, and ropy condition of the blood, particularly when the disease is fully formed. He expressly tells us, he never saw a case unaccompanied by the former of these symptoms, while the latter appears to have been as universal*; and I have hence been induced to add both these signs for the first time to its specific character.

[The mind remains clear almost to the last. A favourable issue is denoted by a rising of the pulse, a return of heat to the surface, an inclination to natural sleep, and a diminution or cessation of vomiting, purging, and spasms; these indications being soon followed by the re-appearance of fecal matter in the stools, of bile, of urine, and of saliva. Mr. Scott dwells on the rapid sinking of the pulse as one of the most invariable symptoms; the exceptions being only a few, and chiefly where remedies are promptly administered. In an early stage, the pulse generally becomes small and accelerated, and, on the accession of spasm or vomiting, suddenly ceases to be distinguishable in the extremities. The length of time, during which a patient will sometimes live in a pulseless state, is extraordinary. Dr. Kellett relates a case where the pulse was gone within three hours from the attack; yet, the man lived in that state from the 3d of October, at four P. M., to the 6th, at two P. M. On the cessation of the spasm or vomiting, and sometimes apparently from the exhibition of remedies, the pulse will return to the extremities for a short time, and again cease. The superficial veins and arteries are not always collapsed, even when the pulse has ceased; and, if opened, they will bleed. Their parietes then collapse, and no more blood can be extracted. In every fatal case, the circulation stops, at least in the extremities, long before death.†]

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Pulse and
circulation.

The following appearances were remarked on dissection: an enormous distention of the stomach and bowels, not from air, but a gelatinous substance; little sanguineous turgescence on the surface of the organs, but an absence of the moisture and glossy character of health: the liver much enlarged from the quantity of blood contained in its vessels, and, on one part of its convex surface, a considerable extravasation of blood: the gall-bladder filled with bile, and projecting beyond the edge of the liver; the bile of a very dark colour, and the gall-ducts pervious. The contents of the small intestines were dark-coloured, apparently from an admixture of bile: the contents of the large intestines resembled the white albuminous

Appear-
ances on
dissection
in natives
of Bengal.

* The appearances of the blood in the epidemic cholera of Europe correspond to Mr. Annesley's description of them in relation to the disease in Asia. The blood is observed to be black or dark coloured, not unlike tar, and in its consistence thick, ropy, and semi-coagulated. It may be doubted, however, whether Dr. Good was correct in altering the definition, so as to embrace these changes in the blood; for, according to the Madras Report, in a few cases they did not occur, though the blood was always deficient in serum, and destitute of the buffy coat. Chemical analysis of the evacuations from the stomach and bowels proves, indeed, that what the blood has been deprived of, is to be found in them, inasmuch as the fluid and more copious part of them consists of pure serum, and the coagulated part, or flaky matter, of fibrin. — Ed.

† Scott's Report on the Epidemic Cholera, &c., p. 21—25. Madras, 1824. Professor Cruveilhier knows of some instances, in which the brachial artery was opened, but only a few drops of blood could be procured from it. Anat. Pathol., livr. 14me. In several cases, the editor has felt the carotids beating forcibly, when no pulsation could be perceived in the arteries of the limbs.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Slightly
varied in
Europeans.

Dissections
at Madras.

matter that was discharged before death.* The urinary bladder was quite empty and wholly shrunk into the pelvis; the kidneys apparently diminished; the lungs so much collapsed as hardly to fill one half of the cavity of the chest: no fluid in the pericardium.

Such were the appearances in the body of a sepoy. In the European subject they were the same, with the two following exceptions: the stomach and intestines were distended with wind, instead of with gelatinous fluid, and hence collapsed upon puncturing them: the veins on the outer surface of both, as well as of the mesocolon, were turgid with blood.

[An excellent description of the appearances on dissection in the cases at Madras was published by Mr. Scott, and it shows, that they vary considerably in different examples. No particular alteration is found, he says, in the serous membranes; but the mucous ones generally exhibit signs of disease. The lungs are not unfrequently found in a natural state, but more commonly they are gorged with black blood, and assume the appearance of liver or spleen. Sometimes, however, they are collapsed, lying in the hollows at the sides of the spine, and leaving the thorax nearly empty. The heart and large vessels are distended, and sometimes even its left cavities are filled, with dark blood. In the abdomen, the vessels of the viscera are turgid.† According to Mr. Scott, the stomach

* In a certain number of cases at Paris, which proved fatal in the blue period, Cruveilhier found the small intestines distended with an enormous quantity of choleric fluid. When, however, the patient had got through the blue stage, and died some time after the reaction, none of this liquid was seen in the small intestines, but a yellowish or greenish pultaceous substance, which is compared to the meconium. The follicles were constantly enlarged: every shade of colour, from pink to a reddish black, was seen in different instances in the mucous coat. Frequently, points of ecchymosis were noticed; and when the intestine was of a brownish red colour, and a piece of it was held between the light and the eye, the most delicate arborescent vascularity was seen. Vascular congestion was almost always most strongly marked near the valve of the cæcum, and diminished in proportion to its greater distance from this point. Frequently, such congestion was restricted to the two or three last feet of the small intestines, though sometimes it was manifest through their entire length. In general, the intensity of the redness was in an inverse ratio to its extent. But, from all the facts which came under Cruveilhier's observation, he concludes, that it is in the great intestines the morbid appearances are the most constant and important. These bowels are sometimes distended with fluid; sometimes contracted at intervals, as if encircled with a cord at particular points. The choleric fluid was usually found in the great intestines, characterised by its limpid quality, and flakes of mucus, or its resemblance to rice-water. The genuine fluid of cholera, according to Cruveilhier, is only met with in the bodies of those who have been rapidly destroyed by the disease, and is not copious, unless the alvine discharges have been suppressed. When the patient has struggled two or three days against the disorder, the choleric fluid is not pure, being frequently of various colours, or, like the mucous secretion, tinged with blood. The follicles of the large intestines, near the valve of the cæcum, are in general much developed, and perforated at their centre, which is indicated by a black point. Frequently they are surrounded by a red areola. (Cruveilhier, *Anat. Pathol.*, livr. 14me. p. 37.) — Ed.

† The disease, as it presents itself in Europe, agrees with this account. In the *post mortem* examinations at Paris, Cruveilhier noticed, that the right cavities of the heart and the left ventricles were distended with a great quantity of blood. The left ventricle was sometimes moderately dilated, but, in other instances, so contracted as not to contain a drop of blood. The large arteries were full of liquid blood, but the small ones contained none at all. The whole of the venous system, and more particularly the veins of the abdominal viscera, were gorged with blood. (*Anat. Pathol.*, livr. 14me. p. 38.)

generally preserves its ordinary volume, sometimes containing greenish or yellow turbid matter. The intestinal tube is sometimes collapsed, but more frequently filled with air, distended into pouches containing whitish, turbid, dark, or green fluid. No fœcal or other solid matters are found in the intestines; but, very commonly, large quantities of the congee-looking fluid, or of turbid serous matter. The duodenum, and occasionally the jejunum, are loaded with an adherent whitish or greenish mucus; at other times deprived of their natural mucus, and often quite healthy. Traces of bile in the intestines, or of any substance that has descended from the stomach, are exceedingly rare. Sanguineous congestion, and even active inflammation, Mr. Scott represents as more frequent in the bowels than in the stomach, yet as being often absent. He confirms the account given by other writers of the large quantity of bile in the gall-bladder; but he adds, that the gall-ducts are about as often constricted and impermeable as in the opposite state. The appearances of the spleen, he says, are so diversified, that they throw no light on the nature of the disease. The vessels of the mesentery are generally very full of blood. In the head, appearances of congestion, and even of extravasation, have been frequently observed, but not uniformly. In one case, the sheath of the spinal marrow was inflamed.*

The essential morbid appearances, produced by spasmodic cholera, form yet a subject of enquiry; for those which sometimes occur and sometimes do not, cannot be regarded in this light.† Perhaps the accumulation of the greater part of the blood in the vessels of the

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.
Dissections
at Madras.

* In the patients who were victims to the disease at Paris, the spleen was generally small, dense, but more brittle than usual, and with an appearance as if the blood had been pressed out of it. The brain and cerebellum were healthy, but injected with blood as in asphyxia; sometimes with slight ecchymosis; there was little serosity in the ventricles, or under the arachnoid membrane. The medulla spinalis was healthy, its different sections being tinged with red points. The semilunar ganglions, the solar plexuses, the ganglions of the great sympathetic nerve, the intervertebral ganglions, the pneumo-gastric nerves, and the whole of the nervous system, appeared to Cruveilhier, in the numerous cases where he examined it, to be perfectly sound; and he expresses his surprise that Delpech should have met with traces of inflammation in the semilunar ganglions. (Anat. Pathol., livr. 14me. p. 38, 39.)

† On this interesting point, the statement of Cruveilhier confirms the truth of the remark in the text. After giving a description of the appearances revealed by dissection, Cruveilhier thus proceeds:—"From what has been explained in relation to the morbid anatomy of cholera, it is manifest, that this disease is not one of those of whose nature a complete interpretation can be found in any anatomical lesions; since, besides the cases in which such lesions are clearly marked, others are met with in which they are slight, doubtful, and even totally absent. If, then, we apply the fundamental axiom in morbid anatomy to cholera, namely, that every organic change, that does not constantly attend a disease, cannot be considered as making an essential part of it, the importance of *post mortem* examinations in the study of cholera will seem but limited, and the true characters of it must be looked for elsewhere." (Anat. Pathol., livr. 14me. p. 40.) Dr. Brown, after detailing what was remarked in the dissections at Sunderland, expresses his conviction, that the symptoms during life throw much more light on the nature of the disease, and its appropriate treatment, than appearances after death. (Cyclop. of Pract. Med.) In Europe, the bodies of those destroyed by cholera putrefy slowly, as is always the case with subjects which have been deprived of considerable quantities of blood. On the other hand, the alimentary canal putrefies rapidly, as happens in al. cases of considerable sanguineous congestion of the digestive organs. (Cruveilhier, op. cit. p. 35.)

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SPEC. III.
Cholera
spasmo-
dica.

viscera, the absence of all solid or fecal matter from the intestines, the suppression of the flow of bile into them, the full state of the gall bladder, the empty and contracted state of the urinary bladder, and the presence of a gelatinous or turbid serous fluid in the bowels, are the changes most inseparably connected with the worst and fatal forms of the disease.]

The disease proved every where more fatal to natives than to Europeans: and, among many of the former, no blood could be drawn from the arm, however urgent the symptoms.

Disease as
it occurred
in Bombay.

The Bombay accounts differ in only a few particulars: the spasms were sometimes clonic or agitative, instead of being entastic or rigid. "In a large proportion," says Mr. Orton, "there is no appearance of spasm in any part of the system. In many there is no purging; in some, no vomiting; and, in others, neither of these symptoms.* I have already observed, that these last were by far the most dangerous cases, and that the patients died under them, often in an hour or two; the nervous power appearing to be exhausted almost instantaneously, like the electric fluid from a Leyden jar. Mr. McCabe, depôt-surgeon at Poonamallee," says the same author, "informs me, that he has found the cases which to common observation might appear the most desperate (those which were attended with spasms and retchings of extreme violence) actually amongst the most tractable: a truly valuable remark, which my own experience fully confirms. Dr. Burrell saved eighty-eight out of ninety of his later cases†," meaning those of this kind. And in his general description of them, he says, "that the retching was constant, and the spasms so violent as to require six men to hold the patient on his cot." On the other hand, nothing can be more evident than the intractable and fatal nature of those cases, in which the pulse, instead of rising, sinks at once; in which there are no spasms, and scarcely any vomiting or purging; and in which not only the excretion of bile, but of all the secretions, appears to be entirely suspended.‡ [It is also particularly remarked by Mr. Scott, that, in the low and most dangerous form of cholera, whether in European or native cases, spasm is generally wanting, or is present in a very slight degree.§]

Sometimes
attended
with almost
instant
death.

Violent
spasms a
sign com-
paratively
favourable.

* In Europe the disease exhibits similar varieties: thus, with respect to the cases which occurred at Paris, Cruveilhier informs us, that the most constant symptoms were, thirst, pain in the epigastrium, vast alteration of the features, with the eyes shut and retracted, small pulse, enfeebled voice, suppression of urine, and disposition to coldness. On the contrary, in some cases, *evacuations from the bowels, vomiting, and cramps*, did not take place. The absence of evacuations from the bowels, however, was a rare circumstance, and also an unfavourable one, as denoting not a stoppage of the flux, but merely an interruption of the excretion of the matters secreted. (Anat. Pathol., livr. 14me. p. 11.) — ED.

† Bombay Report, p. 68—80.

‡ Essay on the Epidemic Cholera, p. 29.

§ Report on the Epidemic Cholera, &c. Madras, 1824. At Paris, the spasms were amongst the least constant symptoms of cholera, and Cruveilhier assures us, that the gravity of the disorder could not be estimated by them. They began in the muscles of the feet, and proceeded more or less rapidly to those of the legs, thighs, arms, abdomen, thorax, and masseters; they were exceedingly painful, occurred at more or less considerable intervals, and persisted, in some instances, to the last moment; while, in others, they ceased with the collapse. (Anat. Pathol., livr. 14me. p. 12.) In the cholera at New York, spasms occurred in about three fourths of the cases. They were sometimes late in their appearance. Their violence seemed to be proportioned to the severity of the purging and

In a few instances, there was even an overflow of yellow bile itself, making an approach to our first species: but these were uniformly of the slightest kind. "The bile," says Mr. Orton, "appears in excess only in the milder cases.*" And to the same effect Mr. Curtis: "The cases which appeared after this were all of a different nature, much less severe, and none turned out fatal. They were all of them combined with bilious accumulations."†

The rapid or sudden fatality of the disease in its severest onsets is very singular. Even Sonnerat affirms, "that the patient was frequently carried off in twenty-four hours." But in the later epidemic of 1817 and 1818, this term was wonderfully abridged. "In the second, and very fatal visitation," says Mr. Orton, "of the epidemic experienced by Brigadier-General Pritzler's force, I am informed that vomiting, purging, and spasms were very frequently, in a great measure, if not entirely, absent; all the powers of the system failing at once, and death commonly ensuing in three or four hours from the attack."‡ Several instances were heard of at Hoobly, and other places, of natives being struck with the disease whilst walking in the open air: and who, having fallen down, retched a little, complained of vertigo, deafness, and blindness, and expired in a few minutes. Mr. Gordon gives a history of many cases of this kind. At Bellary, a tailor was attacked with what was supposed to be cholera, and instantly expired, with his work in his hands, and in the very attitude in which he was sitting.§

The dissections in this presidency seem to have shown even a more extensive range of visceral effusion, congestion, and extravasation than those in Bengal. Not a single thoracic or abdominal organ was to be traced unmarked by vascular rupture, or turgescence of black blood, or unstamped with some other morbid appearance: the stomach and liver, however, were chiefly affected, and the urinary bladder was always shrivelled.|| The blood, when drawn from the arm, was found to coagulate very loosely, and sometimes not at all¶: and the arterial and venous blood were of a like purple hue.**

Of the dreadful spread and havoc of this cruel scourge, we may form some idea, from the report to the Medical Board at Bombay,

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SPEC. III.
Cholera
spasmodica.

In slighter cases, sometimes yellow bile in excess.

Instances of sudden fatality.

Appearances on dissection in Bombay.

Estimate of mortality.

vomiting; they were greatest in robust, especially intemperate persons, and more marked in males than females. In children, they were rare, or slight. See Paine's Letters on the Cholera Asphyxia, 8vo. New York, 1832; one of the most unprejudiced and candid works which the editor has read on this subject; and he feels much obliged to Dr. Paine for his kindness in sending him a copy of his valuable observations.

* Orton's Essay, p. 71.

† Diseases of India, p. 66.

‡ Essay on the Epidemic Cholera, p. 41.

§ Bombay Reports, p. 82.

|| Reports of Dr. Burrell and Mr. Whyte. In the *post mortem* examinations at Paris, the kidneys appeared to Cruveilhier to be in the natural state; but, the bladder was as contracted as possible, and completely empty, at least in those subjects which had perished in the stage of asphyxia; for urine is commonly found in the bladder of other individuals, who die in the period of reaction. In the dissections made in France, the liver was gorged with blood, but unequally, which gave the part a morbid appearance. — ED.

¶ Orton's Essay, p. 69.

** For the ravage and treatment of this disease in the Madras presidency, see, in addition to Mr. Scott's Report, Sketches of the most prevalent Diseases of India, comprising a Treatise on the Epidemic Cholera, &c. By James Annesley, Esq. Lond. 8vo. 1825.

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SPEC. III.
Cholera
spasmo-
dica.

Striking
proof of
benefit
from medi-
cal aid.

Plan of
medical
treatment.

Estimate of
advantages
from vene-
section

by George Ogilvy, Esq., secretary. The population in this district alone is calculated at from 200,000 to 220,000; the total number of ascertained cases amounted to 15,945: giving a proportion of seven and a half per cent. Of these, 1294 had been without medicine or medical aid; and there is reason to believe, that every individual of this number perished. Mr. Ogilvy, indeed, expressly asserts, that it was not ascertained, that any case had recovered in which medicine had not been administered: while it is gratifying to learn, on the other hand, that, among those who had received the advantages of the judicious and active plan concurrently pursued, the proportion of deaths was reduced to 6.6 per cent.; an alarming mortality still, but a marvellous improvement upon the natural course of the disease. In other parts of India, indeed, the deaths, under the same plan of treatment, seem to have been still fewer: for Dr. Burrell, surgeon to the sixty-fifth regiment, at Seroor, out of sixty cases, makes a return of only four deaths; and Mr. Craw, on the same station, asserts that, on an early application for relief, the disease, in his opinion, "is not fatal in more than one in a hundred cases."*

The curative plan, pursued with so much success, consisted in bleeding, according to the strength of the patient; calomel in free doses of from fifteen to twenty grains in a dose; with one or two grains of opium, repeated, if necessary, every four, three, and in some cases every two hours, till the urgency of the symptoms abated: to these were added a liberal use of the most diffusible stimuli, as the spirit of nitric ether, ammonia, camphor, hot arrack and water, mixed with spices and sugar, camphor-mixture, essential oil of peppermint, the hot bath, stimulant embrocations; and sometimes the antimonial powder in doses of five grains, given in conjunction with the calomel.

We are informed of a fortunate blunder in one instance, capable of being laid hold of and applied with great practical advantages. "By mistake, twenty grains of calomel and sixty minims of laudanum were given at an interval of less than half an hour. The patient was inclined to sleep; nothing more was done; and, in two hours and a half, he was as well as ever he had been in his life."

Many of the cases proved successful without the use of the lancet: but, according to Dr. Burrell's return, the hazard of omitting it, whenever blood could be made to flow, seems rather unjustifiable: for, out of a hundred patients eighty-eight were bled, and twelve not; of the former, two died, being one to forty-four; of the latter, eight, being two thirds, or nearly thirty to forty-four. The fact appears to be, that scarcely any case occurs without an alarming congestion in one or more of the larger organs; and hence it is highly hazardous to depend upon stimulants alone, and

* Further experience has not proved such efficacy in this, or any other mode of treatment hitherto suggested; nor does any method appear to be attended with uniformity in its degree of success in various places. As Dr. Joseph Brown observes, "in taking these estimates into consideration, we must always recollect, that, in epidemics, there is often a very wide difference in the gravity of the disease at different points, or in different years; indeed, sometimes at nearly the same point, and in the same year; so that, when we hear of an extremely small loss, in proportion to the number attacked, long experience does not permit us to doubt that, in such a case, the type of the disease has been very mild." (Cyclop. of Pract. Med., art. CHOLERA.) — ED.

to boast of their power to subdue the disease without active evacuants in the beginning of the curative process, as Hufeland, and other writers on the Continent, appear to have done*; and as Dr. Rankeen of the Bengal station has recommended still more recently, who treats calomel with as much contempt as the lancet, and depends exclusively, from the first, upon large doses of opium, and highly pungent and diffusible stimulants.†

Of the remote cause of this extraordinary malady we know nothing. That it is an epidemic, and of a most malignant character, is unquestionable; but whether dependent upon an intemperament of the atmosphere, or upon specific contagion, is by no means ascertained. The first was the most obvious mode of accounting for it, and that which was earliest adopted; but by many practitioners it has been rejected, for the following reasons:—The disease, instead of spreading from a centre to a circumference, or following the course of the wind, or of the sun, or obeying any other meteorological power, marched by a chain of posts, often in direct opposition to all kinds of atmospherical influence, and in the immediate track of human intercourse. “It prevailed,” observes Sir Gilbert Blane, in his remarks upon Mr. Corbyn’s letter, “to a degree equally violent at all seasons of the year: in regard to temperature, from 40 or 50 degrees of Fahrenheit to 90 or 100; in regard to moisture, during the continuance of almost incessant rain for months, to that dry state of the atmosphere which scarcely leaves a vestige of vegetation on the surface of the earth.”‡ To which I may add, that it often fought its way in the very teeth of the most powerful monsoons, and left untouched various districts that bordered on its career, and whose less salubrious features seemed to invite an acquaintance with it. It appeared also and vanished in all the changes of the moon, and in all states of atmospherical electricity: and at sea as well as at land. Mr. Corbyn, indeed, gives an account of its having made an attack upon the Lascars of an Indian, in its passage from England to the Cape of Good Hope, in 1814; and that too in the month of January, when the weather was intensely cold.§ [This alleged attack of cholera, however, requires proof of its having been similar to the spasmodic cases in India, where it had not then arisen in its worst and most fatal shapes. It is even asserted by Mr. Scott, that no instance has ever been recorded of the crew of a ship suffering from cholera, that is to say, the real spasmodic cholera, until the vessel had

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Cholera
spasmo-
dica.

and large
doses of
calomel.

Remote
cause of the
epidemy
unknown.

Intemper-
ament of the
atmosphere
objected to.

* N. Annalen, i. 404. Gazette Salulaire de Bouillon, 1787.

† Edinb. Med. and Surg. Journ., Jan. 1823, and compare with Dr. Robson’s History, id. Oct. 1823, p. 507. Had Dr. Good lived to have seen this extraordinary disease, perhaps he would not have been such an advocate for the early use of the lancet. At all events, its advantages are disputed by men of great experience. Dr. Mouat’s observations are decidedly against bleeding. Venesection, which was tried in forty-six cases, was of no benefit, and, in several, it was decidedly injurious. The treatment found to answer best consisted of large doses of calomel with opium, magnesia, stimulants, blisters to the epigastrium, bottles of hot water to the sides and feet, and friction with the hand. (See Trans. of the Med. and Phys. Soc. of Calcutta, vol. iv. art. 22.) Respecting the practice of bleeding, then, we see much diversity of opinion exists. In the King’s Bench, where the editor has had opportunities of seeing the disease, venesection in the early stage of the complaint has generally been abandoned, though sometimes practised in the febrile stage with decided success. — Ed.

‡ Med. Chir. Trans.

§ Treatise on the Epidemic.

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Cholera
spasmo-
dica.

Whether
derived
from spe-
cific con-
tagion.

come into communication with the land.* Spasmodic cholera, we know, broke out in the Mauritius, 3000 miles from a place where it was prevailing; but it was after a vessel had arrived from that very place.]

Many pathologists, who suppose the disease to be propagated by a specific contagion, have endeavoured to show, that it appeared in no town or district where a direct communication had not been maintained with some place in which it was prevalent. [They insist on the considerable mortality amongst the attendants on the sick; a point, however, on which much contrary evidence is adduced, and which perhaps may be generally quite as well explained by the exposure of such individuals to the same atmospheric causes, or other circumstances by which the patients themselves were affected. Yet, some facts in support of contagion are strong: the medical officer, Mr. Scott says, in repeated instances, has been the only European in the corps or station who has suffered. Dr. Daun and Mr. Gray, assistant-surgeon of H. M. 89th regiment, were both seized with the disease, after close intercourse with the sick; and two friends, who attended the latter, were also attacked, while no other European officer of the corps suffered. Another fact, stated by Dr. Kennedy, is, that, in the course of the twelvemonth ending June, 1826, four medical officers of the Bombay establishment out of 116 died of cholera, while among the other gentlemen, civil and military, so great a proportion of casualties from cholera did not occur in the whole course of the epidemic from 1817 downwards.† But, in order to show the contradictory evidence brought forward, it is only necessary to mention, that while one reporter states, that every one of the thirty medical attendants of the 65th regiment was attacked, another declares, that only one out of 101 medical attendants of the Royals had the disease.‡ No doubt, therefore, some important collateral circumstances, adequate to explain this difference, must have existed, though they were not traced and specified. By some reasoners, little importance is attached to the numerous instances recorded, in which the disease, after appearing in a district, has extended itself over it, apparently by communication with the sick. Facts of this kind, as a critical writer observes, are easily explained by the non-contagionists, provided it cannot be shown, that *the disease spread gradually, and from the original spot of its appearance as a centre, except where a deviation from its regular course was connected with special intercommunication, or special seclusion.* One of the most striking features of a contagious disease is its progressive advancement from district to district, and from country to country, and more especially the *slowness* with which it advances. He joins Sir Gilbert Blane in the belief, that such a character can only be derived from the mode of propagation being by human

* Report on the Epidemic Cholera, &c. p. 39.

† See Kennedy's Notes on the Epidemic Cholera, 8vo, Calcutta, 1827. This work, and the writings of Sir Gilbert Blane, contain the best exposition of the arguments in support of the doctrine of contagion.

‡ At St. Petersburg, 25 medical attendants out of 264 were attacked, and nine of them died; yet Drs. Russell and Barry, who communicate these facts, inform us, that in one Military General Hospital, where 400 cases of cholera had been admitted, only one medical practitioner was seized with the disorder.

intercourse. When viewed in relation to this character, the history of the cholera of the East furnishes a very powerful argument in support of its contagious nature. Its slow progress across and down the peninsula, in 1818, can hardly be explained on any principle, except that of propagation by human intercourse. This intercourse, Dr. Kennedy observes, was established by means of the troops; and it seems, that *since 1817, it has been enforced from one end of India to the other by the annual relief of troops.** In short, it is argued, that some effectual intercourse must be necessary for the propagation of the disease, on account of the remarkable shortness of its course, and the brief interval which (if it be really propagated by infection or contagion) elapses betwixt exposure and seizure. The two characters will not interfere with the rapidity of diffusion of a contagious disease over a town, or thickly-peopled district; but must render nearly harmless all ordinary communication between one district and another even moderately remote. The cholera spreads rapidly in a particular spot, but slowly from one part of the country to another. But by far the most unequivocal evidence of the propagation of a disease by intercourse with the sick, is that which is enforced by Dr. Alison; namely, the evidence of the disease breaking out in several previously unaffected districts, at a time corresponding with the arrival in them and sickening of persons, who had intercourse with the sick in an infected district. It is to this criterion chiefly, that we must look for the decision of the question of the contagiousness both of cholera and other diseases, whose propagation by intercourse is at present a subject of dispute.† It has been asserted, by the believers in the propagation of cholera by contagion alone, that the disease has always been found to move in the line of human intercourse; but, though this seems to be the case, its diffusion has not been in proportion to the intercourse between infected and healthy districts. Thus, as Dr. J. Brown has noticed, its appearance at Madras, whither, according to the exclusive doctrine of contagion, it ought to have been conveyed almost three months earlier, by trading vessels from the infected districts, was simultaneous, as Mr. Bell informs us, with its origin in parallel latitudes in the interior. It did not reach Ceylon, to which, on the contagious principle, it ought to have been conveyed at a much earlier period, by shipping from infected parts of the coast, until it had previously gained the nearest point to it on the Continent, about Adam's Bridge, and had been long prevailing on both coasts of the peninsula.‡ Unfrequented villages have been observed to suffer the invasion of the disease, as early as the marts of intercourse and commerce. Thus, from a statement of Mr. Orton, it

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spasmodica.

* Notes on the Epidemic Cholera, p. 53.

† See Edinb. Med. Journal, No. 93, p. 426—431. As an illustration, the breaking out of the disease at Jaulnah may be referred to, after the arrival of a party of troops there from Nagpore, in which place the disease was then raging. From Jaulnah it next extended itself to Malligaum and Hyderabad. (Madras Report.) In several fortresses in the territory of Orenburg, also, the invasion of the epidemic coincided in point of time with the arrival in them and sickening of persons coming from infected places. (Lichstenstadt on the Asiatic Cholera, as it appeared in Russia in 1829—30. Vide Edinb. Med. and Surg. Journ., No. 108.)

‡ Orton on Cholera, 2d ed., p. 332.

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Cholera
spasmo-
dica.

seems to have reached some villages on the north bank of the Cavery, detached from any frequented road, and considerably to the eastward of Trinchinopoly, quite as soon as this large and frequented town, whither it *appeared* to have been imported by a company of sepoys.

"Its movement along *navigable* rivers has been dwelt upon, as evidence that human intercourse has been the means of its diffusion; but when we are informed, by Mr. Orton, that the disease manifested this predilection for the course of rivers in the peninsula of Hindostan, where navigation is scarcely carried on even to the most trifling extent, on any river, and scarcely an instance can be mentioned of any great road running on the banks of a river, for they almost always cross them, we must acknowledge that more weight has been attached to the argument than it is calculated to bear.

"The disease, in its general course, has manifested a preference for one line of movement, and has rejected another, though there has been no striking difference in the amount of human intercourse between the two directions to explain the preference and rejection. Its progress, in a north-western direction, across the European continent, has been briefly described," &c.

For three years it prevailed in the Ottoman territories bordering on the Levant, without losing any of its destructive character; for in November, 1832, it carried off, in Aleppo, 4000 victims in 18 days; yet, as Dr. Brown has observed, it did not penetrate into Turkey in Europe, and other extensive realms on the shores of the Mediterranean. "Assuredly," says he, "this could not arise from want of means of transport, and few will be disposed to ascribe it to the perfection of the quarantine department of the Sublime Porte. "Since its appearance in Great Britain, "a similar predilection has been displayed; for we find it at this instant 140 miles to the N.W. of Sunderland, whilst six miles south is the extreme distance to which it has reached in that direction; and from the point which it attained, Seaham Harbour, after attacking eight persons, and destroying three, it has since vanished."* Dr. Brown is led to the conclusion, that the disease possesses a contagious property, though in so feeble a degree as to render it more than questionable, whether it can be the sole agent in diffusing the disease. That endemial influences prevail; was convincingly illustrated in Sunderland, where the disorder committed infinitely the greatest ravages in dirty parts of the town, situated low, and near the banks of the river. In the village of Newburn, the whole of which is thus conditioned, 120 persons, of whom 55 perished, had been attacked out of a population of 550, and the disease had not yet ceased.]

Certainly, it is not easy to reconcile the suddenness of its appearance and disappearance with the laws of contagion, so far as we are acquainted with them; a subject we shall have occasion to examine at large, when treating of fevers. Mr. Allardyce informs us, that in the 34th regiment the disease appeared on the 21st of September, and committed dreadful ravages before night. On the 25th it abated remarkably, and in three days more entirely vanished.† In like manner, the severe attack which was

* Cyclop. of Pract. Med.

† Reports communicated to the Bombay Medical Board.

experienced by the Bengal and Madras troops at Nagpore occurred at the end of May, 1818. On the 10th of June the rains appeared with great violence, when the epidemy abated, and immediately afterwards ceased.* Neither is the idea of a contagious propagation reconcilable with the escape of the great body of persons exposed to the influence of the disease, considering that, from its not being apprehended to be contagious, no means, as is usual in other cases, were employed to avoid the infection.

The state of the atmosphere, as described by Mr. Allardyce, did not differ materially from that in Nagpore. The disease made its attack in close and sultry weather, and vanished after thunder-storms and heavy rains. But we can draw no conclusion from these phenomena; since it seems to have shown itself quite as frequently and fatally after a long succession of rain; and, as already observed, sometimes in very cold and dry weather. The remote cause, therefore, of this mysterious scourge remains yet to be ascertained; and affords further proof, if indeed proof were wanting, of our general inacquaintance with the nature and economy of epidemics.†

* “The gradual diffusion of a disease through a limited community, those near the sick being first attacked, and others in succession in proportion to their proximity, Dr. Joseph Brown admits, is strong evidence of a disease being contagious. But this evidence, he observes, has rarely been furnished by the cholera; the general statement from India, indeed, is of a totally opposite nature; for we learn that, on its appearance in any place, numbers are simultaneously attacked, and that, after committing unheard-of ravages for a short period, its cessation is as sudden as its invasion. One example, however, of this gradual diffusion, is given in the Russian Reports, and this is furnished by Dr. Schimanski, with regard to the extension of the disease at Iletsk. He says, he was able to trace the progress of the disease in the first eight cases, thus: the husband of the woman (a soldier’s wife), from Orenburg, was taken ill three days after her; and, about the same time also, two girls, who lived in the immediate neighbourhood of the soldier, and who visited him soon after his arrival from Orenburg; the aunt of these girls, who nursed him, was next attacked, and from her it passed to her own two sons.” See Dr. Brown’s article in *Cyclop. of Pract. Medicine*, and the *Edinb. Med. and Surg. Journ.*, No. 108. — Ed.

† Various facts, mentioned by Dr. Haslewood, support the doctrine of spasmodic cholera being a contagious disease. (See *Med. Gazette*, vol. x.) Dr. Elliotson has a strong suspicion, that the disease is contagious; but believes, that it may also spread independently of contagion (*Lect.*, &c.), and this is the view which is entertained by many others, amongst whom is Dr. J. Brown. Individuals in good health, and at the same time in good circumstances, are much less liable to be attacked than individuals labouring under the noxious effects of poverty, intemperance, or debility from previous illness, for which two last conditions, it is scarcely necessary to say, affluence will be no counterbalancing protection. A very large proportion of the individuals, carried off by this disease in London, are known to have been habitual spirit drinkers. Undoubtedly, exceptions to this statement frequently occur, reminding us of our ignorance of the particular influences which sometimes render thousands susceptible of the disease, though greater numbers, equally exposed to the contagion, if it be such, seem to defy its power. To every mind it would not be satisfactory to attempt to solve the difficulty by reference to the fact, that persons in health are not easily attacked, because, when spasmodic cholera suddenly carries off hundreds and thousands in a particular district, town, or division of an army, it is not to be imagined, that all these unfortunate subjects had really been in previous bad health. Here endemic influence must be supposed to be in operation. The first case of spasmodic cholera which ever occurred could not possibly have arisen from contagion, but from some atmospheric or terrestrial causes affecting the unfortunate individual the first subject of it. The history of the disease seems to prove, that the extension of it is partly, at all events, owing to the same influences. Thus, the

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Cholera
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dica.

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spasmo-
dica.

General
recapitula-
tion ;

and deduc-
tions.

Explan-
ation of
various
symptoms.

With the exception of the plague, there is no epidemy on record that seems to have been so strikingly marked by violence and irregularity of action, and especially by a rapid exhaustion of living power; the patient, as we have seen, often expiring within twelve hours from the attack, and sometimes sooner.

The first characteristic feature that occurs to us, on a review of the disease, is the total absence of the bile from the whole range of the alimentary canal in every case, while this fluid was as generally found in abundance in the gall-bladder: and, perhaps, the next is, the turgid, and, in some instances, the ruptured state of the liver, from the quantity of blood with which it was distended. The general battery of symptoms appears, therefore, to have been opened by a spasmodic constriction of the bile-ducts; for without such an obstruction, we cannot account for an exclusion of all bile from the intestines. From this point, as from a centre, the spasmodic action seems to have spread in every direction, and under a clonic or entastic form to have seized upon almost every organ: preying with greater violence according to the greater degree of debility, and hence, perhaps, of irritability of the system; into which law we are to resolve it, that the natives, supported by a less rich and nutritive diet than Europeans, suffered more severely, and died more frequently. The stomach and intestines, generally speaking, first participated in the spasm of the bile-canals, and hence the griping pains, the nausea, and violent commotions which spread from the one to the other.

In all cases of nausea, from whatever cause, we see the brain and the surface of the body peculiarly diminished in their energy, whence the skin, to the remotest extremities, collapses beneath a deadly chill, and the heart sinks with insupportable languor. In the ordinary course of sickness, the nausea subsides, and the general organization recovers its balance, or it terminates in full vomiting, which excites an universal reaction. And where any such reaction occurred in the disease before us, it was hailed as a favourable change; and hence the wisdom of the stimulant plan, so frequently had recourse to by the medical staff for the purpose of producing a revulsion. But where this was not accomplished, the living power, feebly recruited from its fountain from the first, or not recruited at all, became exhausted in every organ apace, the strength failed, and hope gave way to despair.*

disorder may have had many distinct origins in different individuals and parts of the world. In support of this argument, the following is a strong case. When the disease attacked the 6th regiment, at Colabah, in July, 1828, it was in the midst of the rainy season, when *not a case had been seen for months either in or near Bombay*. Mr. Campbell, in paying his evening visit to the hospital, found an old soldier, who had been under treatment some time for an hepatic affection, suddenly seized with cholera. Mr. Campbell went to the opposite extremity of the building for the purpose of consulting another surgeon, and actually found him busily employed with another man, who had been almost simultaneously affected. The disease proceeded, and destroyed 60 men and several women. (Spence in Med. Gazette.) The fact of cholera having broken out at Vienna, when Austria had numerous *cordons sanitaires* on the side of Hungary, is often quoted by those who, like Cruveilhier, deny its contagious nature. — ED.

* Searle, Stevens, Desruelle, and others, believe that the poison of cholera (supposing such to exist) is introduced into the circulation, and combined with the blood, through the medium of which it produces its effects on the solids of

In the island of Ceylon, where the disease raged with even more violence than on the Indian continent, the patient very frequently expired in twelve or fifteen hours from its attack. The dissection of those, who perished thus early in this quarter, has put us into possession of some interesting facts, varying in a few particulars from those that occurred on post-obit examinations in the island of Bombay. The brain was in these cases chiefly the congested organ, the liver sometimes appearing to have no congestion whatever; and hence the inactivity produced in the brain by the nauseating state of the stomach, must have been greatly augmented by oppression. Consentaneous herewith, we are told by Dr. Davy, that in some of the cases which he dissected in this region, there was a flaccidity of all the muscular parts*, as in animals killed by

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Cholera
spasmodica.
Vital
energy
rapidly
exhausted.

the body, and not by any direct impression on the nervous system. Other pathologists represent cholera as making its first impression on the nervous system, either without limitation, or with the restriction of such impression to the central ganglionic system. These views are rejected by others: thus, Dr. Paine concludes that the brain and nerves are not the primary seat of cholera, and that they subsequently participate less than some other organs in the morbid action; he allows, however, that they may serve to transmit the impression from the morbid agent to other parts of the system; and this is, perhaps, as much as the advocates of the hypothesis mean to assert. "If we look at the mind," says this intelligent physician, "we shall find it 'sitting unimpaired and serene amidst the ruins of organic life.' Respiration is only performed by the voluntary muscles; pulsation has long ceased in the extremities; the heart has become inaudible to the stethoscope; yet the integrity of the mind remains undisturbed; and the indifference with which it contemplates the wreck over which it presides, proves, that at least its peculiar and last abode in the body is still its own uninvaded possession. The powers of the mind are fully exercised in respect to the voluntary muscles; and it is not unusual to witness successful attempts at walking, when the pulsations of the heart are only sensible to the ear." While the functions of the brain are wholly undisturbed, "the heart and the lungs, and all the viscera of organic life, are involved in a chaos of disordered action. Animal sensibility is not known to be particularly affected, till near the termination of life. It is scarcely augmented or diminished, or in any way modified, — a remarkable circumstance, if we regard the common influence of disease on that property, and which serves to demonstrate the little participation of the nervous system in the great conflict of nature. The sufferer is even conscious of the unequal distribution of heat, and feels, as intensely as in health, the action of stimulants upon the cold, and shrivelled, and livid surface of his body. He hears and sees with a natural acuteness." Such facts, Dr. Paine conceives, render the hypothesis of diminished nervous energy quite paradoxical. His particular notion is, that "the proximate cause of cholera asphyxia consists in a *simultaneous modification of all the organic powers and functions*, produced by some unknown morbid poison, acting either directly on the properties (of the body?), or transmitted indirectly through the nervous system." If, says he, we assume a local proximate cause, we should always be able to detect its existence; but "we have now been presented in New York with many cases in which the invasion of the most malignant constitutional symptoms was abrupt, and in which there could not be detected a solitary evidence of antecedent local disease." See Paine's *Letters on Cholera Asphyxia*, p. 71—77. 8vo. New York, 1832. The rest of Dr. Paine's argument on this part of the subject is instructive, even without admitting his own particular hypothesis; for, he has ably exposed a variety of erroneous views, and this, at all events, is clearing the way to truth. — Ed.

* In Europe this is not generally the case: thus, at Paris, the muscles were found by Cruveilhier to be in such a state of rigidity, that he compares their appearance to what is seen in the bodies of persons executed. (*Anat. Pathol.*, livr. 14me. p. 35.) At New York, the muscles were also observed to be very rigid in the dead body. (*Paine's Letters on Cholera Asphyxia*, p. 147.) They are likewise of a very florid colour. — Ed.

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SPEC. III.
Cholera
spasmo-
dica.

electricity or hunted to death. There was also a tenderness of the muscular fibres; while antecedently to death, as in many of the Bombay cases, there was no difference in the colour of the arterial and venous blood, and no instance of a buffy coat on the blood that was drawn; which in reality was so loose and uncoagulable, that, when venesection was necessary, the vessels were opened with the greatest caution, from the difficulty of restraining the blood afterwards.

The disease
sometimes
fatal before
a total dis-
charge of
living
power.

In certain cases, the muscles of the extremities, and even of the face and lower jaw, were observed to move in a convulsive manner, and sometimes to be drawn into tremulous knots, fifteen or even twenty minutes after death had closed the scene. So the heart of the traitor, when extirpated after he has been beheaded, from an accumulation of sensorial power, has been seen to palpitate, and even to leap up for several times in succession, after its removal from the pericardium.

Living
power
usually
exhausted
more gra-
dually.

Commonly, however, the living principle seems to have been exhausted more generally and progressively; and the muscles, and, indeed, most of the organs, freed from the tetanic power that at first constricted them, to have been gradually relaxed and flaccid: and hence, that comparative absence of pain that occurred so frequently a short time before death, with a flow of a cold sweat over the surface of the body, and of bile into the smaller intestines.*

General
curative
intentions
analysed.

The grand objects, in the treatment recommended by the medical boards in India, were to equalise the distribution of the blood and nervous influence, to counteract the spastic action so common to the irritable diathesis of hot countries, to guard against the danger of congestion in the vital organs, and to restore the natural secretions of the system. The great danger of congestion was guarded against by bleeding; spasm and irritability were opposed by powerful narcotics; and the full and repeated doses of calomel were admirably calculated to act upon the secretents, and restore them to their proper functions, and especially when united, as was occasionally the case, and, perhaps, always ought to have been, with antimonials. All this was sometimes accomplished rapidly, and the disease ceased in a few hours. But if, from the violence of the attack, or from any other cause, it could not be accomplished at all, such violence could not long be resisted; and the patient in a few hours, or at the utmost in two or three days, fell a prey to its fury.

Late in-
formation.

Sir James McGrigor has informed me, that the disease in the Mauritius did not appear till after the arrival of a ship on its coast from Ceylon, where the epidemy was raging; some of the crew of which were seized with it on their passage, though all were well at the time of sailing. As a single fact, this is not sufficient to prove contagion; but, in the present uncertainty of the subject, the statement is worth treasuring in mind.

* Some writers impute the effects of spasmodic cholera to the absence of bile; yet, abundance of this fluid is in the gall bladder, and even after the reaction, when bile has found its way into the stomach and bowels, this circumstance frequently does not prevent a fatal termination. (Cruveilhier, *livr. 14me. p. 41.*) This eminent pathologist inclines to the doctrine, that the disease essentially consists in an affection of the secreting function of the gastro-intestinal mucous membrane. He is led to this conclusion by the quality and quantity of the fluid voided from the bowels. — Ed.

[Another fact, bearing on the same question, and tending to support the doctrine of contagion, is, that the disease does not appear to have reached the shores of the Persian Gulf by land; but broke out in the sea-ports and trading towns, immediately after the arrival of ships from Bombay. It soon afterwards raged in Schiraz, and its extension to Ispahan was greatly apprehended; but the latter city was preserved from it, as is alleged, by the governor-general prohibiting the caravans of Schiraz from passing through the place.*]

Mr. Cornish, in a communication dated Tabriz, in Persia, October, 1822, announcing the arrival of this fearful disease on the western boundary of the Persian empire, expresses his belief, that it is an epidemic not dependent on contagion, and then adds the following alarming prediction: "The atmosphere is generally clear, cold, and healthy; and if, in such a climate, this epidemic commits such ravages as almost to equal its effects in many parts of India, I much fear it will extend to Europe, where the crowded cities and great population will make it more severely felt than it has been in the scattered cities and scanty population of Persia."†

Dii, prohibite minas! Dii, talem avertite casum!

[Unhappily, Mr. Cornish's prediction has proved but too true, and the identity of the disease in Hindostan, Europe, and America, admits of no rational dispute. Its nature is every where the same, though subject to modifications, more especially in relation to its fatality, which has been much greater in certain places and in the invasions of particular periods than in others.

The Bengal Report adverts to a fever which attended the second stage of the disease. Now this consecutive fever is stated by Dr. Russell and Sir David Barry to have been more frequent in Russia than in India; that is to say, the direct restoration to health from the cold stage, without the intervention of such fever, was more common in India than at St. Petersburg. Amongst other points of difference between the cholera of India and that of Europe, they specify the following:—"The evacuations, both upwards and downwards, seem to have been much more profuse and ungovernable in the Indian than the European cholera, though the quality of the evacuations is in both cases the same. In India the proportion of deaths in the cold stage, compared with those in the hot, was far greater. Then the number of medical practitioners and hospital attendants, attacked with cholera, in proportion to the whole number employed, and the other classes of society, is stated to have been, beyond all comparison, greater in Europe than India."‡

Dr. Brown's definition of epidemic cholera, as it presents itself in England, is, perhaps, as correct as any that has been suggested:—"After watery diarrhœa, or other generally slight indisposition, vomiting and purging of a white or colourless fluid, violent cramps, great prostration and collapse, the last occurring simultaneously with the vomiting and cramps, or shortly after them. Should the patient survive the last train of symptoms, a state of excitement

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Cholera
spasmo-
dica.

Identity of
the disease
in Asia,
Europe,
and Ame-
rica.

A febrile
re-action
more fre-
quent in the
European
than Asiatic
epidemic.

Evacu-
ations more
profuse in
India.

Deaths in
cold stage
more nu-
merous.

More of
medical and
other at-
endants
affected in
Russia
than India.

Dr. Joseph
Brown's
definition
of this
species of
cholera.

* Dr. Rehman, in Hufeland's Journal for June, 1824.

† Medico-Chir. Trans. vol. xii.

‡ See the Report of Drs. Russell and Barry to C. C. Greville, Esq.

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Cholera
spasmo-
dica.
The col-
lapse.

and fever supervenes.* By *collapse*, Dr. Brown particularly signifies the feebleness, or almost the arrest of the circulation; the deathlike appearance, the coldness, shrinking, and occasional blueness of the surface, which may be observed in other diseases, after they have existed some time, but which occur in the cold stage of the epidemic shortly after its commencement. The *degree* and *early accession of this collapse*, and the *white discharge*, seem to Dr. Brown the only distinctive marks between this stage of the epidemic and ordinary cholera.

Cruveil-
hier's divi-
sion of the
subject.

Cruveilhier arranges all the complaints pertaining to epidemic cholera under three heads:—1. Choleric purging, with slight cholera. 2. The state, or degree, between this and the worst forms of the disease, he terms *cholera moyen*. 3. Lastly, malignant cholera (*cholera très-grave*), with or without asphyxia. By *choleric purging*, he means that in which the evacuations are liquid, colourless, with little or no smell, and an appearance like that of turbid whey, or rice-water. The transition from a choleric purging into cholera, is denoted by vomitings, painful spasms in the limbs, urgent thirst, severe pain about the epigastrium, sudden change of the countenance, a sinking of the eyes into the orbits, feebleness of the voice, tendency to coldness, and depression of the pulse.†

Incipient,
cold, and
febrile
stages.

A better division is into the *incipient*, the *cold*, and the *febrile stages*. All men of experience agree, that most of the cases seen in this country are preceded by some kind of indisposition, as lassitude, vertigo, sense of nausea, oppression about the stomach, or a sense of indescribable uneasiness in it, which ailments are immediately followed by a degree of diarrhœa. Such are the *premonitory* symptoms, as they are called, in which a looseness of the bowels is generally one of the principal circumstances. This looseness, frequently accompanied by tenesmus and colic, when very profuse, brings on, almost immediately, considerable emaciation, complete prostration of strength, feebleness of the voice, a tendency to coldness, and slight cramps. Writers also coincide on another important fact, which is, that, when such diarrhœa is rightly treated in its early stage, the accession of cholera may commonly be prevented.‡ Varieties occur, however, in the mode of attack; for, while, in the greater number of instances, a diarrhœa precedes the commencement of this species of cholera, in other patients, the complaint comes on without any kind of warning, frequently in the middle of the night, or a little before daybreak§, although the individuals were perfectly well at the time of going to bed. They awake with severe pain about the stomach, and are soon seized with vomiting and purging, the discharges being at first tinged with bile, but soon becoming

Vomiting
and purg-
ing.

* Dr. Brown, in Cyclop. of Pract. Medicine.

† Anat. Pathol., livr. 14me. pp. 1—11.

‡ The same interesting circumstance was noticed at Paris:—"Je n'ai pas vu un seul devoiement cholérique, convenablement traité des le moment de l'invasion, qui ait dégénéré en choléra."—Cruveilhier.

§ "It has long been remarked in other countries, that the cholera makes its attack in the night, and particularly towards the approach of day. I think it has so happened in New York, in the majority of cases; and the next period most common is in the morning, and the next in the afternoon." Paine's Letters on Cholera Asphyxia, p. 84.

colourless and serous, or assuming the appearance of a turbid whitish fluid, like rice water, with white flakes in it. The evacuations from the bowels are so copious that they are rapidly followed by extreme debility, and, even before any vomiting and cramps take place, they sometimes bring on a collapse, especially in elderly subjects, or individuals, whose constitutions are already impaired by intemperance or recent illness.* In some few instances, there is not a single evacuation from the bowels; yet the large intestines are found after death completely distended with the fluid characteristic of the disease. Thus is ushered in the *cold stage*, so called from the remarkable tendency which the body has to become exceedingly cold; it is, indeed, of an icy coldness, or, as Cruveilhier expresses himself, the coldness is like that of death itself. Even the tongue and breath, as it issues from the mouth, are cold. Dr. Elliotson, on passing a thermometer into the mouth, found it to range from 84 to 90 degrees. Cramps, attended with a severe degree of suffering, begin with the vomiting, or even precede it; the pulse becomes frequent, and extremely feeble; the respiration hurried, sometimes 36 in a minute†, the features shrink, the eyes sink into the orbits, and the countenance, which is of course wonderfully changed, is either livid, or very pale.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Cold stage.

Cramps.

The first cholera patient whom the editor saw, was in the cholera hospital near Bethlehem, and, though only 22 years of age, his face would have warranted the conjecture of his being at least sixty. This person had not been ill more than twelve hours. The *facies cholericæ* is so characteristic, that Cruveilhier represents it as being in general sufficient to establish the diagnosis. The eyes sunk in the orbits; the dirty leaden hue of the countenance, when it is not livid; the tendency to blueness of the lips and cheeks; the hideous retraction of all the features; the emaciation, of truly astonishing rapidity, and only partly accounted for by the profuse evacuations from the stomach and bowels; are common appearances in cholera.‡

After a time the vomiting and spasms either totally subside, or recur at lengthened intervals. The pulse, which has been becoming smaller, and more and more accelerated, at length ceases entirely in the extremities, though the beating of the heart, and sometimes of the carotids, may still be perceptible. Severe pain in the epigastric region is one of the most constant symptoms: when the patient is asked what is the matter with him, he places his hand upon his stomach, or the sternum, and complains of vast oppression, dejection, and sometimes of burning pain in that organ. Many of Cruveilhier's patients said to him, "Remove what I

Cessation
of pulse.

* See case by Cruveilhier in *Anat. Pathol.*, livr. 14me. p. 21. This author met with several cases in which the stools consisted of blood and mucus, and the patient was removed by tenesmus: in some of these instances the post-mortem examination detected precisely the same anatomical lesions as in dysentery. (*Op. cit.* p. 18.)

† Respiration varies in different examples: it may be natural or hurried; in other instances, slow and sighing, but always incomplete; not reviving the blood, as Cruveilhier expresses himself; a defect which he refers less to any impairment of the mechanical part of respiration, than to some injury of its vital phenomena. (*Anat. Pathol.*, p. 13.)

‡ See *Anat. Pathol.* par Cruveilhier, livr. 14me. p. 12.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.
Blueness.

Alteration
of voice.
Suppression
of urine.

suffer there, and I shall get well.”* If the disease be accompanied by blueness, which is not invariably the case, various shades of this colour occur on the hands and feet, and frequently also on a considerable portion of the arms and legs; indeed, the whole body has been known to exhibit a blue appearance. The hands are shrivelled, corrugated, and soddened, and the fingers often drawn together. The patient is tormented with ardent thirst, and has an insatiable desire for cold beverages. The voice is surprisingly altered, it is like that of a person dying of strangulated hernia, and characterised by mingled huskiness and feebleness. Not only is there a stoppage of the flow of bile into the intestinal canal; the urine, in severe cases of cholera, is not secreted during the collapse, and consequently the bladder is empty. When the disease has advanced to its final stage, the patient is like a corpse; the eyes, partly open, shrivel up, either from the absorption of their humours, or from a mechanical transudation of them; the sclerotica, just under the cornea, becomes as dry as parchment, that is to say, immediately above the margin of the lower eyelid, and where it is exposed to the air; the patient is absolutely motionless, and seems to be connected with life merely by a little circulation, and a little respiration, the mechanical part of which still goes on, though without any beneficial effect on the blood. Even the tonicities of the skin seems to be quite destroyed, so that, when pinched, it remains in a fold, just as it does in the dead body; yet the sensations continue, and the patient usually hears very well; nay, when a sudden paroxysm of epigastric pain attacks him, when cramps come on, or he has an urgent desire to go to stool, he will move with violence, and jump out of bed with a degree of vigour that often astonishes the attendants.†

Rise of
temperature
and con-
tinuance of
it after
dissolution.

Twitches of
muscles
some time
after death.

Sometimes, a little previously to dissolution, the temperature of the skin rises, and after death the body becomes warm, and, what is worthy of remark, has been known to continue so for a space of time never observed after death from any ordinary diseases.‡ In some examples, long after all vitality had apparently ceased, twitches and quiverings of the muscles occurred; thus Dr. Elliotson, in speaking of a case which fell under his notice, informs us, that one finger would be drawn in, and then another, the lower jaw would move up and down, and a quivering of the muscles of the thigh might be observed. The same occurrences, we find, were noticed in India.

Mr. Rumsey, of Beaconsfield, has recorded an instance, in which the action of the muscles was very surprising. About half an hour after the patient's death, *i. e.* “the perfect termination of

* See Anat. Pathol. livr. 14me. p. 12.

† Cruveilhier, op. cit. p. 19. In the first patient the editor ever saw with this disease, these circumstances were very forcibly exemplified. He had no pulse; he was blue nearly from head to foot; and, though only twenty-two, he looked like the remains of a person of sixty; yet he tried to get up, half an hour before he died.

‡ On this subject, Cruveilhier makes a curious remark: — “The coldness of the skin,” he says, “is less intense in the corpse than the living subject;” a circumstance in a great measure owing to the absence of that clammy perspiration which inundates the skin in the last stage of cholera. Mr. Rumsey, of Beaconsfield, accounts for the fact on a similar principle. See Med. Gazette for Sept. 1833, p. 836. In several subjects the warmth of the trunk maintained itself at the end of eighteen hours, very much like what happens in asphyxia.” (Anat. Pathol., livr. 14me. p. 35.)

respiration and circulation, a friend observed his left arm to move, and very soon it obeyed the contractile and relaxing powers of its muscles, slowly, but unceasingly, for about twenty minutes; it then ceased, and the right arm soon made an extensive motion, which threw the bystanders into a panic. Contraction and relaxation, or a moving backwards and forwards, continued, perhaps, to the end of an hour and a quarter. At this moment, the arms, previously cold, had become evidently warmer.”*

The condition, which nearly resembles death, may last several hours, or even one, two, or three days, but rarely longer. It commonly terminates fatally, though this is not invariably the case; and at Paris, Cruveilhier saw several cholera patients restored to life by a kind of resurrection, after lying a whole day, and for a greater period, in the most desperate state.†

A considerable number of patients never rally from the collapse at all, but perish without any reaction taking place in the system. The lungs may be filled with oxygen gas, the stomach may have the most powerful stimulants introduced into it, and the bowels have the most irritating clysters injected into them; yet, without any more effect, than if the mucous surface of each of these organs were completely insensible, and destitute of all influence on the economy. Under these circumstances the disease has only two stages, *the incipient and that of collapse*; but if the patient get over the latter, he is not yet out of danger, for the reaction, which ensues, becomes a *febrile stage*, often leading to a fatal termination.‡ The transition from the collapse to the febrile stage is for the most part very gradual; perhaps, after the skin has been of an icy coldness for twenty-four or forty-eight hours, or some other uncertain period, a trivial rise in its temperature commences, and the pulse begins to be distinguishable at the wrist again, generally beating about 80, and soft. The patient, on being roused, is perfectly sensible, and complains of severe pain in the head, and giddiness, and that the light distresses his eyes. “The tongue, in this early stage, is clean and moist, the bowels are readily acted upon by medicine, and the discharges are feculent, and, though somewhat clayey, contain a proportion of bile; but the urinary secretion is sometimes either not restored, or is considerably deficient for a day or two after the establishment of the fever. In the progress of the fever the tongue becomes black, and sordes accumulate about the teeth; the eyes become more and more injected; the intellect more and more torpid; the urinary secretion now returns, and the urine, which was at first dark-coloured and cloudy, is now limpid and pale; and the alvine discharges are darker than at first.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Many persons never rally from the cold stage.

Transition from the cold to the febrile stage.

Symptoms in febrile stage.

* Med. Gazette for 1832-33, p. 836. On September 28. 1833, a man died of Cholera in the Fleet Prison, without any reaction having taken place. Nearly an hour after the breathing and circulation had ceased, his fingers began to move; then the lower jaw; and, on the sternum being pressed upon, the right forearm was suddenly thrown across the breast. The muscular movements lasted twenty minutes. — Ed.

† Anat. Pathol., livr. 14me. p. 19.

‡ Speaking of the febrile stage, or the reaction, as it is commonly called, Cruveilhier pronounces it to be a period replete with danger; because “the equilibrium must be re-established, and the determination to the intestinal canal must cease gradually, and not be converted into acute or chronic inflammation.” (Anat. Pathol., livr. 14me. p. 29.)

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Difference
from
typhus.
Its dura-
tion.
Variety of
it.

However flushed the countenance may appear, the temperature of the surface is below the healthy standard, and the pulse is seldom above 90. It differs from typhus, not only in the deficiency of calorific power, but in the absence of subsultus and muttering delirium; for though delirium sometimes occurs in the night, the condition of the intellect is generally rather one of torpor than of irregularity." The duration of the febrile stage, corresponding to this description, is from a week to ten days, and the end often fatal. Dr. Brown considers the brain as the organ principally affected in it, and regulates the treatment accordingly, without neglecting, however, the state of the intestinal canal. In another form, consequent to a less formidable state of collapse, than what precedes the symptoms above enumerated, the surface of the body is of a higher temperature, and the pulse stronger and more frequent. Depletion could be more freely practised, and the disease was more tractable. But, according to Dr. Brown's experience, the mildest and most successfully treated variety of the febrile stage was attended with pain in the epigastric region on pressure, headach, and giddiness; the tongue being either clean, with a disposition to become dry and glazed, or slightly white and furred, the skin warm, the pulse free and forcible, the urine high-coloured, the thirst considerable, little or no confusion of ideas, and the eyes not injected. A febrile stage, answering to this type, was observed to follow cases, in which the collapse had been inconsiderable, and the urinary secretion not suspended, and in which the disorder had not always been attended with vomiting.

Danger
generally in
proportion
to the col-
lapse.

The degree of danger seems to be considerably influenced by the degree of collapse in the cold stage; and it is well observed by Dr. Brown, whether we are to dread a fatal result in the cold or the excited stage, the intensity and duration of the collapse in the former of these stages are the measure of the danger: for, if the patient die in this stage, he dies of collapse; and if he survive it, and pass into the state of fever, the character of this fever is dangerous in proportion to the same collapse.*

Danger of
giving
opium too
freely.

At Paris, numerous patients, presumed to be convalescent, afterwards died in a comatose state; and yet, on opening their bodies, scarcely any vestiges of cerebral congestion were found—hardly any serosity under the arachnoid membrane, or in the ventricles. Many of these unfortunate terminations Cruveilhier ascribes to the immoderate use of opium in the stage of asphyxia; and he particularly cautions us to recollect, that though the animal economy, in this deathlike condition, is insensible to the most powerful medicines, no sooner does reaction begin, than the system becomes again obedient to the customary laws of life, and acted upon not only by what is now administered, but by what has been previously given.†

* Dr. Brown in *Cyclop. of Pract. Med.*, art. CHOLERA. The depression of the pulse seems to Cruveilhier to be a better criterion of the degree of danger of the disease, than any of the other symptoms. "It is," says he, "by the pulse, that the reaction begins to show itself, just as it is by the pulse that the collapse (concentration) is denoted. When it is suspended, not for a few moments, but for some considerable time, the danger is imminent." (*Anat. Pathol.*, livr. 14me. p. 13.) Here we see an agreement between the two latter writers; but Dr. Brown's prognosis, deduced from the degree of collapse, is more clearly explained, more especially with reference to the patient's fate, in the febrile as well as the cold stage.—Ed.

† *Anat. Pathol.*, livr. 14me. p. 32.

The state of the blood in spasmodic cholera has attracted general attention. Cruveilhier found its properties much the same, both in the dead subject and after venesection. It was characterised by a deficiency of serum, and a consistence very much like that of thick currant jelly. It coagulates imperfectly, and is often compared to tar.

Writers, in general, impute the loss of serum to the prodigious and rapid abstraction of fluid from the circulation to supply the secretion from the mucous coat of the intestinal canal. In fact, the liquid part of the discharges from the stomach and bowels has all the properties of serum; while the flakes in it consist of fibrin. It is alleged, that the blood, taken away from patients in cholera, does not assume a scarlet colour; but Cruveilhier thinks it would have been more correct to say, that it does so only slowly, and not at all, when its surface is dry.* In the United States, Dr. Gale detected an oily matter, peculiar to the blood of patients afflicted with cholera, and different from that described by Lecanu, and discovered by Schwilgué. The former, he says, is obtained by solution of the solids, contained in the blood, in alcohol; the latter is found floating on the surface of the blood, when taken from the body. The proportions vary with the stage of the disease, increasing as it is more advanced.† Free acetic acid, regarded by Herrman as a constituent of healthy blood, was ascertained by him to be deficient in the blood of patients labouring under spasmodic cholera.‡ Dr. O'Shaugnessy analysed the blood of some cholera patients, and not only ascertained that there was a deficiency of water in it, but of its saline ingredients. In two cases, there was a total absence of carbonate of soda. His experiments led him to believe that the saline particles, deficient in the blood, passed away with the alvine discharge; but Dr. Elliotson examined the matter voided from the bowels in several instances where no alkali had been taken, and found it acid§; and he does not consider it proved, that there is an excess of alkali in the evacuations, as would happen according to the theory suggested by Dr. O'Shaugnessy.

Spasmodic cholera can only be treated in the same unsatisfactory manner as all other diseases, whose causes are unknown; and, as Cruveilhier has justly said, we combat merely its effects; just like an unskilful practitioner, who, having to treat a severe ophthalmy, excited by the lodgment of a foreign body on the conjunctiva, attacks the inflammation with the whole series of antiphlogistic means; whereas the simple removal of the foreign body would have been sufficient for the cure.||

The treatment of cholera spasmodica may be conveniently considered, in relation to the incipient stage, the cold stage, the febrile stage or period of reaction, and the later consequences of the disease.

The diarrhœa, and other ailments, generally preceding cholera, may almost always be treated with complete success, if attended

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.
State of the
blood.

Treatment
imperfect,
as not
directed to
the cause of
the disease.

Incipient
stage.

* Anat. Pathol., livr. 14me. p. 39.

† See Paine's Letters on Cholera Asphyxia, p. 155. 8vo. New York, 1832.

‡ See Med. Chir. Review, July, 1831, p. 285.

§ Lect. Med. Gazette, 1832-3, p. 630.

|| Anat. Pathol., livr. 14me. p. 45.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Incipient
diarrhœa.

Indication
in cold
stage.

External
stimulants.

Application
of ice to
epigas-
trium, &c.

Ammonia-
cal applica-
tions, blis-
tering spine,
&c.

Internal
stimulants.

to early enough. But, on this subject we need say but little, as the discussion would only oblige us to return to the consideration of diarrhœa. Opium is the principal remedy, and when employed early, seldom fails. If there be reason to believe, that the looseness is accompanied by chronic enteritis, leeches should be applied to the abdomen.

In the *cold stage of cholera*, or the period of asphyxia, or concentration, as it is sometimes termed, medical practitioners agree very generally about the right indication, which, is to rally the constitution by every possible means. The action of the heart and lungs must be promoted; and the whole system must be roused, as far as it can be done, through the medium of the skin, the mucous membrane of the alimentary canal, and respiratory organs. Friction with a flesh brush, or with stimulating liniments, or large sinapisms; the application of mustard poultices to the epigastrium, and of warm air, or vessels filled with hot water, to the surface of the body; constitute the plans by which the system is usually acted upon *through the skin*. In the last case which the editor attended, the patient happened to be in a small room in the Fleet Prison, and, a good fire having been made, it became like an oven, and had an excellent effect in contributing to restore the circulation. Frictions with snow or ice have been occasionally tried, but without any decidedly good effect; though Cruveilhier states, that he has occasionally had successful recourse to the partial application of ice for the relief of particular symptoms: thus, he says that ice, put on the epigastrium, sometimes stops the vomiting, and alleviates the intolerable uneasiness about the stomach.* Frictions made with snow, on parts affected with cramp, he also speaks favourably of. But, besides the means, here specified as acting through the medium of the skin, many others have been occasionally tried, as compresses steeped in ammonia laid along the course of the spine; the application of nettles; the moxa; the cautery; touching the back along the spine with a hammer heated in boiling water; or scalding the surface of the body with boiling water. At Paris, the application to the spine of a blister, ten inches long, and two broad, is alleged by Cruveilhier to have been sometimes serviceable.

The *therapeutic means, operating through the medium of the mucous membrane of the alimentary canal*, consist of brandy, ammonia, ether, mustard, oil of turpentine, capsicum, oil of cajeput, and numberless other articles. Their moderate use in the stage of collapse is undoubtedly necessary; but they ought not to be given without limitation, or too long; for it should never be for-

* Anat. Pathol., livr. 14me. p. 46. Dr. Paine has long been in the habit of employing ice for the relief of vomiting. "It also allays the thirst, and thus removes one great cause of restlessness. How far it exerts an impression on the morbid action is a subject of inquiry. An extraordinary degree of heat is evolved about the region of the stomach: in one case, in which I applied the thermometer to the surface, a temperature of about 106 degrees was denoted while the patient was expiring. I have imagined that these cases will be more generally benefited by the external application of ice to the epigastric region, than by mustard cataplasms. Ice, too, I have applied advantageously to the head in obvious congestions of the brain, which are frequently attendant on cholera, or arise as one of its consequences. It is also very advantageously applied, for the relief of spasm, to the muscles affected." Letters, &c. p. 42.

gotten that in cholera there is a determination of blood to the mucous membrane of the bowels, and, when reaction begins, the tendency to inflammation is very great: however, when the collapse is considerable and protracted, internal stimulants cannot be dispensed with; and, in addition to those given by the mouth, others are sometimes injected into the large intestines. Thus, a pint or two of warm water, with from four to eight ounces of brandy, and one drachm of laudanum, is sometimes thrown up the rectum, and this even repeatedly, as the editor has seen, not only without ill consequences afterwards, but with a degree of comfort to the patient which he has immediately acknowledged.

Opium, which is so useful in choleric looseness, is deemed by some practitioners hurtful in the cold stage, as tending to prevent reaction, and to bring on the comatose state, in which the patient often dies. In most of the cases, attended by the editor and Mr. Hooper, in the King's Bench, opium has been more or less exhibited in the cold stage; but the latter gentleman, whose experience in spasmodic cholera is great, employs this medicine less freely now than formerly. It does no harm, perhaps, in the cold stage; but, if reaction take place, it then increases the determination of blood to the head and alimentary canal in a very hurtful degree. The cramps, which appear to call for its exhibition, may be assuaged by it; yet, it is to be remembered, that they generally soon cease of themselves.

Emetics, occasionally prescribed in the cold stage, for the purpose of rousing the system, is a practice commended by Dr. Brown, of Sunderland, and some other practitioners. Cruveilhier conceives, that emetics are less objectionable in cholera, than they would be, if it were a gastritis; and he tells us, that the cases, which were treated with ipecacuanha at Paris, were neither remarkable for their successful nor their unsuccessful results. On the whole, emetics may be set down as means of no very great efficacy in this disease.*

Purgatives, especially calomel, as our author has explained, was largely exhibited in India, and the voice of the profession in England is becoming more and more favourable to its administration. Thus Dr. Brown, in speaking of the treatment of the cold stage, observes, that, whatever stimulants be employed, calomel, in doses of five or six grains, repeated at intervals of three or four hours, should be given at the same time; it is to be observed, however, that calomel is administered, not with the view of purging, but of affecting the mouth as quickly as possible, and restoring the proper secretions of the digestive organs.

Amongst the means, acting through the medium of the mucous membrane of the alimentary canal, is the solution of carbonate of soda, and of the hydrochlorates of soda and potash.† This

GEN. IX.
SPEC. III.
Cholera
spasmodica.

Not to be
given with-
out limit-
ation.

Clysters of
hot brandy
and water;
with lauda-
num.

Opium.

Reasons for
not giving
opium too
freely in the
cold stage.

Emetics.

Calomel.

Saline
treatment.

* "Where they have been employed in asphyxiated cholera, I think I am warranted in saying, they have hastened the fatal termination. Where they have been employed with success, I have no doubt, it has been in what is regarded as the forming stage of the disease." See Paine's Letters on Cholera Asphyxia, p. 44. New York, 1832.

† Half a drachm of the carbonate of soda, twenty-four grains of hydrochlorate of soda, and six of that of potash, are contained in a dose, which is repeated every half hour.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

medicine has been tried in the King's Bench prison, under the editor's superintendence, but, without any very well marked success. The common sodaic powders, and the effervescing saline draught, are often relished by the patient, but have little or no power over the disease.

Tempera-
ture of
beverages.

The patients are usually greedy of cold beverages, and even of such as are ice-cold. Cruveilhier, after making a comparative trial of these and hot drinks, declares in favour of the latter, the reaction having taken place more quickly and frequently under their use.

Bella-
donna, and
nitrate of
bismuth.

Of the extract of belladonna, and nitrate of bismuth, in combination, as a means of relieving the vomiting when particularly obstinate, the editor is not in possession of any very precise information.

Bleeding.

Great diversity of opinion prevails respecting the propriety of bleeding in the beginning of cholera. In India the practice was as much praised by some, as it was reprobated by others.* When cholera became epidemic, in the district of the King's Bench, bleeding was very frequently practised on the first accession of the disorder; but, by degrees, this measure became less and less resorted to, and now seems to be nearly renounced in the cold stage of the complaint. However, some practitioners in other parts still regard venesection as advisable at first, while the temperature is not below, or but little below, the natural standard, the pulse tolerably strong, with the spasms violent, and recurring at short intervals, *provided no collapse has preceded this favourable condition.*† But should this condition, with respect to circulation and temperature, have followed collapse, then Dr. Brown is averse from venesection. In the one case, he conceives, that blood-letting breaks the morbid concatenation, and prevents collapse and congestion, and that, in the other, it lowers the vital energies, which are freeing themselves from a state of oppression. But, again, in a more advanced stage, when the constitution is no longer balancing between collapse and fever, and the latter may be considered as established, bleeding is a suitable remedy, if the state of the circulation, and the general condition of the patient, render it necessary.‡ In the decidedly cold stage, however, this physician disapproves of venesection, and, on the whole, his observations on this part of the subject are as judicious as any which have been published. Mr. Annesley assures us, that, in India, bleeding, so far from producing syncope, always improved the pulse, and it is represented, by many of the practitioners in Asia,

Mr. An-
nesley's
observ-
ations.

* Bleeding is supposed, on the whole, to have been more successful in the early stage of the disease in Asia, than it has proved in Europe and America. "I entertain no doubt," says Dr. Paine, "that the greater success of this remedy, in the hands of the Anglo-Asiatics, is to be ascribed to the absence of premonitory diarrhoea in the East, and the retention of the fluids in the system," &c. Op. cit. p. 38.

† In America, bleeding is approved of in the early stage, under the same circumstances as those specified by Dr. Brown. If diarrhoea suddenly invade, and be soon followed by vomiting, without any obvious cause, if the evacuations be serous, the tongue clean, the pulse not much depressed, Dr. Paine pronounces this to be a case for venesection, and perhaps for its repetition. (Letters on Cholera Asphyxia, p. 24.)

‡ Dr. Joseph Brown in Cyclop. of Pract. Med. art. CHOLERA.

as the grand means of preventing the collapse; perhaps, they express, in different terms, the same thing as Dr. Brown has done in a clearer manner.

Mr. Annesley saved nearly all the patients whom he bled; yet here it must be recollected, that this could not have been in the collapse, because then very little blood could have been obtained; the circulation in his examples must have been going on briskly, and therefore they were favourably circumstanced for the practice. As for bleeding in the period of concentration, it is fortunately impracticable; Cruveilhier, who has generally made the attempt in his practice, owns that he could rarely get out of the vein more than a few spoonfuls of blood: he informs us, that he never tried arteriotomy himself, but that he knows of some instances, in which the brachial was cut through, and only a few drops of blood flowed out of it. After bleeding, he always applies leeches to the epigastrium, and over the sternum and ribs, followed by cupping-glasses.*

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Cruveil-
hier's ob-
servations.

The plans, operating through the medium of the mucous membrane of the respiratory organs, comprise the inhalation of oxygen gas, chlorine, and nitrous oxide. Mr. Barnes, of Byfleet, who was in the part of India where the disease first broke out, assures the editor, that no plan is equal to this for efficacy; and Dr. Brown informs us, that in some cases, in which it was tried in Sunderland, an instantaneous amelioration was manifest, the pulse becoming more vigorous, the lips florid, and the patient freed from præcordial oppression. But, says he, the effect has been generally observed to be only transitory. His own opinion is, that inspired for a few seconds in single bladders, no great benefit is likely to accrue from it; but, he would speak less positively of the effect of an atmosphere of diluted oxygen, breathed for a considerable period.†

Inhalation
of oxygen,
&c.

The oxygen and nitrous gases were tried in some hospitals in America, but without benefit, and even the blueness of the skin was not influenced by them.‡

With respect to the proper treatment in the *febrile stage*, or that of *reaction*, much difference of opinion prevails. One point, however, seems pretty well determined, which is, that venesection is not indicated in the commencement of the reaction. Cruveilhier has, in several examples, seen the reaction cease immediately after a premature bleeding, the patient become blue again, and the collapse return, quickly followed by a fatal termination. § Bleeding is

Treatment
of febrile
stage.

Venesection.

* Anat. Pathol., livr. 14me, p. 50.

† Cyclop. of Pract. Med. The editor does not deem it necessary to dwell upon the experiments of transfusion, and of injecting into the veins large quantities of a solution composed of twenty-four grains of carbonate of soda, and 3ij. of muriate of soda in five pints of water. The power of this injection in restoring the pulse and giving the natural colour to the skin, is represented as having been exceedingly prompt, though sometimes transient; so that, on the recurrence of the collapse, it might be necessary to repeat the experiment. With respect to transfusion, it has been most fairly tried both in Europe and America; Dr. Paine observes, "We have nearly abandoned transfusion, from its almost uniform failure. The recoveries, I do not think, have been in the ratio of two to fifty. The temporary effect is very encouraging, but the patients soon die." Letters on Cholera Asphyxia, p. 16. and 50., New York, 1832. One man laughed aloud from the ecstasy of relief, but was a corpse an hour afterwards. p. 51.

§ Anat. Pathol., livr. 14me, p. 51.

‡ Paine's Letters, &c. p. 52.

GEN. IX.
SPEC. III.
Cholera
spasmo-
dica.

Leeches.

not advisable till the reaction is complete, free from perspiration, and accompanied by symptoms of congestion in some part or another. Even then, Cruveilhier prefers several small bleedings to a copious evacuation of blood at once. Leeches are safer than venesection, but require caution: after the reaction has become quite established, the editor has often been much gratified in noticing the vast relief of the suffering about the epigastrium, which they give when applied to this region. When put on the temples and forehead, they are also equally beneficial for the removal of the vertigo and headach resulting from the flux of blood to the brain; an object also materially promoted by the application to the shaved scalp of linen wet with cold water, or an evaporating spirituous lotion.

Disposition
to conges-
tion in
mucous
membrane
of the
bowels, &c.

The fever, constituting this stage of cholera, is usually attended with more or less inflammation, or a great tendency to it in the mucous membrane of the bowels, and often with vast determination of blood to the head. Hence, after the reaction has been fully secured, a freer use of the lancet and of local bleeding frequently becomes necessary.

Return of
the flow of
bile into the
intestines
to be pro-
moted.

Use of
calomel.

The restoration of the secretion of bile, and of its transmission into the intestinal canal, continues, however, still to be the main desideratum; and hence the approbation given by some of the most experienced practitioners in this disease to the free exhibition of calomel. The editor has seen more patients saved by calomel, than any other single remedy. Two grains may be given every three or four hours, and, if assisted with some gentle laxative occasionally, as carbonate of magnesia, castor oil, or the effervescent saline mixture, this medicine will soon restore to the fecal evacuations their healthy quality.

Frequently
fatal con-
sequences
of the
inflam-
mations
excited.

Patient
often dies
comatose.

Patient not
safe even in
the conva-
lescent
stage.

Too often, however, whatever treatment be pursued, the reaction is either incomplete, or brings on inflammation at various points of the system, leading to a fatal result, either in its acute or chronic form. Hence, as Cruveilhier remarks, the prudence of employing internal stimulants and emetics with moderation. In other instances, the patient dies in a comatose or typhoid state, and numerous are the practitioners who have repented of having exhibited opium too freely in the cold stage. This species of cholera is not exempt from peril even in the period of convalescence, and after the patient has got through the cold and febrile stages, he frequently falls a victim to the slightest error of regimen.*

* Cruveilhier makes some very judicious reflections on this part of the subject, Anat. Pathol., livr. 14me. p. 52.

GENUS X.

ENTEROLITHUS.

INTESTINAL, OR GASTRO-INTESTINAL, CONCRETIONS.

STONY CONCRETIONS IN THE STOMACH OR INTESTINAL CANAL.

WHATEVER be the degree of merit, or demerit, that belongs to this genus, the author suspects he must take to his own share: since, so far as he knows, it is yet new to the domains of nosology.

GEN. X.

In treating of the genus COPROSTASIS, we had occasion to observe, that the natural feces, under circumstances there explained, become at times indurated, shrivelled, and broken down into small balls and buttons, as hard as sun-burnt clay, occasionally intermixed with mucus, or oleaginous matter. And, in treating of colica, we referred to concretions of a still harder substance, and of a stony appearance, which, though formed in the intestinal channel, are compounded of other materials than the constituent principles of feces.

The disease at times connected with other affections.

It is for the purpose of including substances of this kind, and which are of very different descriptions, that the present genus has been devised, whose name, ENTEROLITHUS, OR INTESTINAL CONCRETIONS, sufficiently indicates a comprehensive scope.

Name sufficiently descriptive.

We have, indeed, on various occasions, had to give a casual glance at this subject before; and we have particularly observed, that almost all animals are endued with a power of separating or secreting lime and other earths from the blood for particular purposes, as that of forming a shell-covering in insects and worms, and of giving hardness to the bones in all other animals. Under a morbid action of single organs, or of the system generally, this secretion often takes place in an undue abundance, and is poured forth into cavities, where its accumulation and crystallization must be attended with mischief. Such, at times, is the case in respect to the stomach and intestines. But, independently of concretions derived from this source, we often meet with others, produced by an agglutination or crystallization of substances which are contained in the aliment, and which, not unfrequently, give immediate proof of their origin by the aromatic taste, smell, or other qualities which they exhibit. There is also a third species of concretion, occasionally to be traced in the alvine channel, of a harder or softer structure, and of a cetaceous or saponaceous feel, which consists of feces, or the refuse matter of the chyle, more or less combined with oil or mucus, and sometimes consisting almost entirely of the two last.

Various kinds.

As the subject has been never before pursued with a view to any critical examination or systematic arrangement of the tribes of substances that appertain to it, we have not yet perhaps arrived at a knowledge of all their different forms or combinations, as met

GEN. X.
Entero-
lithus.

with in the intestines of man, or the animals of the mammalian class, to which man is degraded by Linnæus: but we may at least venture upon the three following, each of which will furnish a distinct species:—

- | | | |
|-----------------|------------|----------------------|
| 1. ENTEROLITHUS | BEZOARDUS. | BEZOAR. |
| 2. ————— | CALCULUS. | INTESTINAL CALCULUS. |
| 3. ————— | SCYBALUM. | SCYBALUM.* |

SPECIES I.

ENTEROLITHUS BEZOARDUS.

BEZOAR.

FOUND IN CONCENTRIC LAYERS, CLOSELY AGGLUTINATED OR CRYSTALLIZED; CAPABLE OF A FINE POLISH; FREQUENTLY WITH A METALLIC LUSTRE ON THE SURFACE OF EACH LAYER, AND AN ACCIDENTAL NUCLEUS IN THE CENTRE; OF A SPHEROIDAL FIGURE: CHIEFLY CONSISTING OF VEGETABLE MATTER.

SPEC. I. *BEZOARDUS*, or bezoar, is derived from the Persian compound *باد زهر* *Padi-zehar*, or *Pad-zehr*, corrupted into *bedzoha*, and *bezoar*. Literally translated, it is *depellens venenum*, and consequently a direct synonym with the Greek term *alexipharmic*.
It is found occasionally in the stomach of some of the camel

Specific
name,
whence
derived.
Where
chiefly
found.

* Intestinal concretions, in relation to their origin, may be divided into three kinds. The first are not formed in the alimentary canal, but pass into it from some other part, as the liver or gall-bladder, and then undergo more or less modification. The second are only partly formed in the alimentary tube; they have a nucleus, usually something that has been swallowed, round which a certain number of principles contained in that tube accumulate and crystallize. The third are entirely produced in the alimentary canal itself. To the first kind must be referred the calculus found by Dr. Marcet in the rectum of a child which had an imperforate anus, but between whose rectum and bladder an open communication existed. The foreign body consisted principally of phosphate of lime and the ammoniaco-magnesian phosphate.

Whatever may be the origin or composition of intestinal concretions, the irritation arising from them is apt to bring on eructations, frequent vomiting, constant pain and oppression about the præcordia, loss of appetite, constipation, and almost total loss of sleep; and a gradual impairment of the health. In some instances, diarrhœa prevails: the result may even prove fatal. One remarkable case of this kind is on record, where, after the death of a patient, a boy eleven years old, a calculous concretion was detected at the union of the ascending and transverse portions of the colon. It was six inches long; weighed twelve ounces and a half; was enveloped in mucus; and consisted of three fragments articulated, as it were, with one another. A hard tumour was felt in the right hypochondrium while the boy lived, but it was supposed to be the liver. (See *Edin. Med. and Surgical Journal*, July, 1825.) The bad symptoms occasioned by intestinal concretions may continue until the foreign bodies are expelled. In certain cases, the complaints produced by them are ascribable to the manner in which they mechanically block up the pylorus or the intestines. — Ed.

tribes, but more frequently in that of the smaller ruminating quadrupeds, as the goat, and two or three species of the antelope genus, as the chamois, or *wild-goat*, as it is sometimes incorrectly called (the *antelope rupicapra* of Linnæus); and especially that beautiful and elegant animal the *gazhal* (*antelope gazella* Linn.), the tzebi (צִבִּי) of the Hebrew poets, or *roe* of our Bible versions.

The bezoar was formerly employed as a febrifuge and alexipharmic in medicine, and worn as an amulet by the superstitious, who have sometimes purchased a single one from the East at six thousand livres when very fine, and hired them in Holland and Portugal, on particular occasions, at a ducat a day.

It is not quite satisfactorily ascertained, that this species has ever been found in the human stomach; we have, indeed, assertions to this effect in various foreign miscellanies*, and I have hence introduced it into the present place. But it does not often appear, that the substances referred to were examined with sufficient attention, while the authors seem to have used the term bezoar in a very loose and indefinite sense. In one of the volumes of the *Annales de Chimie*, however, the analysis seems to have been scientifically conducted. It was made by M. H. Bracconot, from a quantity of concrete materials voided by a female under the care of Dr. Champion, of Bar-le-duc, which were found to be genuine bezoars.†

The bezoar, as already observed, is chiefly obtained from the stomach of the smaller ruminating animals, whose food, from the complexity of the organ, lies for a long time quiescent in a state of subaction, and is thus enabled to give forth the whole of its juices under circumstances that afford them a much easier opportunity of agglutinating or crystallizing than in many other animals. In the goat kind, these concretions are called *ægagropilæ*; a Greek term, signifying mountain-goat balls. They are of different sizes and figures, the last being chiefly determined by the nature of the nucleus, which, in different individuals, is marcasite, talc, flint, gravel, straw, glass, seeds of plants, &c. In colour they are white, yellow, or brownish; that of the *gazhal* is greenish-blue; and, when recent, highly aromatic, from the odour of the plants on which the animal feeds. The most singular circumstance belonging to them, is the bronze or metallic lustre that appears on the surface of the different layers, and does not strike deeper than the surface. This, however, is said to be a property peculiar to the western bezoar, and seldom or never to be found in those of the East, which are often of as beautiful a glossy white as ivory, Daubenton ascribes the gilt appearance to a vegetable dye, fixed by the tartaric acid of the plants in which the dye exists; and observes, that he has remarked a like appearance on the grinding teeth of many of the ruminating tribes. A few of them rattle on being shaken, the nucleus having contracted and become loose. La Fosse‡ asserts, that he has occasionally met with genuine bezoars or *ægagropilæ* in the stomach of the horse; and similar

GEN. X.
SPEC. I.
Enterolithus bezoardus.

Employed formerly medicinally; and esteemed of high value.

Not quite certain whether ever found in man.

In one instance apparently so.

External and chemical properties.

* Samml. Med. Wahrnehm. b. ii. p. 418; Ferri, Galeria de Minerva, 1696.

† Annales de Chimie, tom. xx.

‡ Cours d'Hippiatrique, p. 158.

GEN. X.
SPEC. I.
Enterolithus bezoardus.

concretions seem at times to be formed out of the animal body, as tubercles to the roots or other parts of certain plants: for Fourcroy affirms, that, in the cabinet of Jussieu, he was shown some curious bezoars of the oriental appearance, white or yellowish, glossy as ivory, and of a spheroidal figure, which were said to be produced by the cocoa.

Spurious
bezoars.
Of what
compound-
ed.

From the supposed value of bezoars in medicine, they were at one time imitated, and the false sold as genuine. These supposititious stones, according to Bomare, were compounded of lobsters' claws and oyster shells, levigated on porphyry, made into a paste with musk and ambergris, and formed into balls of the shape of bezoars; and, where the metallic lines were aimed at, afterwards rolled on gold leaf. The pierres de Goa, or de Malacca, as they were called, were, at least generally, factitious bezoars of this kind; and their spuriousness was capable of proof, by drawing a line with them on a piece of paper previously rubbed over with ceruse, chalk, or lime; the line of the genuine bezoar turns greenish, or of an olive-yellow; that of the factitious remains unaltered. The imposition, however, seems to have been very unscientific, as formed principally of earths, instead of being elaborated from crystallized vegetable juices, which produce this change of colour.

Spurious-
ness, how
detected.

SPECIES II.

ENTEROLITHUS CALCULUS.

INTESTINAL CALCULUS.

RADIATING FROM A COMMON CENTRE, OR FORMED IN CONCENTRIC LAYERS; MOSTLY WITH AN ACCIDENTAL NUCLEUS; MORE OR LESS POROUS; SPHEROIDAL OR OBLONG; ADMITTING AN IMPERFECT POLISH; COMPOSED CHIEFLY OF EARTHS AND ANIMAL MATTER.

SPEC. II.

Where
chiefly
found.

THIS species is by no means unfrequently found in the human stomach and intestines, but far oftener, as remarked above, in the digestive channel of other animals, and particularly in the larger ruminating quadrupeds, or those with a long complicated digestive organ, where the food, as in the formation of the bezoars, is slowly carried forward; and in tardy draught-horses, particularly those of millers, that are fed largely on bran, which seems to yield a ready basis for these concretions.* In Dr. Watson's case, the disease had existed for years: the animal died, aged twenty-two, near foaling; but gave no sign of pain or inconvenience till three months before her death. The calculus weighed 15lb. 12oz.; average diameter $8\frac{1}{2}$ inches by 8 inches.

* Phil. Trans. xxiv. 1705, Thoresby. Id. xlv. 1746, Bailey. Id. xlviii. 1745, Watson.

When chemically analysed, they are chiefly found to consist of a triple or ammoniaco-magnesian phosphate, like the earthy or white-sand calculi of the human bladder; though it is difficult to conceive from what quarter the magnesia is obtained. In the case of millers' horses, some portion of this earth may perhaps be derived from the bran, in which it is always to be traced; but the difficulty still remains with respect to other animals. The figure, whatever be the size of the calculus, is usually spheroidal, except where broken into separate fragments: the matter is deposited for the most part, as in the former species, upon a nucleus of some sort or other; as a small piece of flint, an iron nail, a seed or husk, a piece of hay or straw, a bit of bone with blood originally effused round it*; the structure sometimes radiating from such common centre to the surface, and sometimes evincing distinct plates, more or less united to each other.† In the human subject, these calculi vary from the size of a pea to that of a filbert, chestnut, or hen's egg, and are often still larger.‡ In the case of Margaret Lawer (related under *Colica constipata*)§, they were usually of the two former sizes, and appear to have been formed in great abundance, and with wonderful facility; for her abdomen, upon pressing it, often rattled, from the quantity it contained, with the sound of a bag of marbles. Many of these were rough and sharp-pointed at the edge, evidently fragments or nodules of larger concretions, and gave great pain in the rejection, whether above or below, for they were discharged both ways. The larger-sized weighed rather more than two drachms; and Dr. König, who relates the case, calculated that the whole that were discharged, during the continuance of the complaint, could not amount to less than 5 lb. avoirdupois. In a case related by Mr. Martineau||, some of them, much larger than the preceding, were voided, per anum, by a poor woman in the third month of pregnancy, after having suffered from colic about four or five days: of these, the largest, 8 inches in circumference, and $6\frac{3}{8}$ inches in length, weighed two ounces, sixteen pennyweights, and twelve grains. In this case, and in various others, the calculi seem to have been in the intestines for a considerable period of time without inconvenience; for it is hardly possible to conceive, that all these should have been produced in the course of a week. In another case, in the same journal¶, a calculus of this kind was extracted with some difficulty from the anus, by the surgeon who attended, which weighed eight ounces and a half, and was ten inches and a half in circumference. It is described as "a hard, unequal, ragged, flinty stone," but was not examined chemically. It had been in the pelvis, and nearly of its full size, for several years before its

GEN. X.
SPEC. II.
Enterolithus calculus.
Chemical analysis.

Illustrated
by singular
examples.

* Laugier, in Mém. de l'Acad. Royale de Méd., t. i.

† A female child swallowed a pin, which was not voided from the bowels till she attained the age of eighteen, when its head and one half of the other portion of it was found enclosed in an earthy concretion. (North American Journ. 1827.) — Ed.

‡ Those of considerable dimensions may cause hard swellings in some of the abdominal regions very manifest to the touch, and sometimes even to the sight. See Edin. Med. Journ. July, 1825; and Archives de Médecine, t. ii. p 148.

§ Ut suprâ, p. 185.

|| Phil. Trans., vol. xxxii. 1722—1723.

¶ Ibid., vol. xli. 1739—1741.

GEN. X.
SPEC. II.
Enterolithus calculus.

extraction; for the patient's stools were always obtained with difficulty; and three children, which she had successively borne in the three preceding years, were all marked with a large hollow or indentation in some part of the head; in one instance, of sufficient extent to hold the moiety of a small orange.

Other examples, however, have occurred both of as large a size, and of as firm or flinty a crystallization. Thus, in a foreign miscellany of authority, we have the case of a calculus discharged by the anus of half a pound weight*; and M. Daabal has published a full account of fragments of stony calculi (*saxea fragmenta*) evacuated from the same organ†: as Sir H. Sloane has another case in which the concretions amounted to two hundred.‡

Found large
in draught-
horses, &c.

In draught-horses and oxen, this species of calculus is generally found single and much larger, and often of little inconvenience for years. They vary in size from three pounds avoirdupois to ten or twelve. Of this last weight the author once met with an instance in a horse belonging to Mr. Hayward, a respectable miller of Brundon, near Sudbury, in Suffolk; and Mr. Watson gives an account of two considerably heavier, one already noticed, and the other weighing nineteen pounds, exclusive of the outward shell or crust, which was broken off in several pieces, with a circumference of twenty-eight inches. Both these were laminated, but "had the appearance of a pebble; yet the specific gravity was much lighter, the first weighing in water not more than six pounds. At other times, the crystallization is more like that of gneiss, or of grit-stone, and almost always light and porous."§

Sometimes
gregarious.

Occasionally, however, this species is found gregarious, instead of solitary. Mr. Watson, in the article just quoted, mentions a case of *several* found in the intestines of a mare, and presented to the Royal Society by the Duke of Richmond, in 1746, the nucleus of two of which was found to be an iron nail. And, by turning to another volume of the same journal||, we find these calculi described by Dr. Bailey (for the two articles appear to relate to the same case) as consisting of five in number, of different sizes, some triangular, and resembling a horse-bean, of an olive colour, and finely polished; and one much larger, weighing nearly sixteen ounces troy, and measuring twelve inches by eleven.

Apparently
gneiss, or
grit-stone.

Several of these concretions, we have observed, had the appearance of crystallized gneiss, or of grit-stone; and it is probable, that they were partly of these very minerals; for it is of such that mill-stones are very generally composed; and, by the friction they are perpetually undergoing, there can be little doubt that much of the mill-dust, intermixed with bran, with which millers' horses

* Samml. Med. Wahrn., band ix. p. 231.

† Discursus Academicus de Esthera Norra. Lund. 1715. 8vo.

‡ Birch, Hist. 1685.

§ Phil. Trans., vol. xxxiv. No. 398. In the centre of a calculus taken from a horse, and consisting of phosphate of lime, MM. Laugier and Lassaigue found a large quantity of straw, around which the earthy matter had been deposited. See Andral, Anat. Pathol., t. ii. p. 166. In the intestines of cows and some other animals, balls of hair are common enough. They lick their hairs, and a portion of these, being swallowed, concrete into hard balls, cemented with phosphate of lime and mucus. — Ed.

|| Phil. Trans., vol. xlv. 1746.

are fed so largely, is derived from the powder furnished by these stones.

In man, the calculus is often dependent upon a like accidental origin; for it not unfrequently follows upon a long, free, and injudicious use of prepared chalk, magnesia, or other calcareous earths, for the purpose of correcting acidity in the stomach.* I have known this happen in many dyspeptic cases; and once attended a lady who, from the same cause, laboured under a most painful constipation, till a large mass of what may be called intestinal mortar was removed by a scoop from the rectum. The case, related by Dr. S. Fitzgerald, of Mullingar, was apparently produced by a like cause. The lady had suffered great torture in the hypogastric region, particularly towards the back and os sacrum, for eighteen months; during the last three of which she could not leave her bed, except for tepid bathing, which afforded her transient ease. Upon the rejection of an emollient anodyne clyster, she discharged with it a large hard calcareous ball, of an oval figure, weighing eight ounces and three drachms, exceeding in size an ordinary orange, and so solid that nothing less than the stroke of a hammer could break it. A total liberation from pain immediately followed, and the patient progressively recovered.†

The curative process may be comprised in a few words. If the concretions proceed from an injudicious use of calcareous or magnesian earths, both these must be avoided for the future: and the calculi actually existing be diminished in their diameter by the use of mineral acids, and quickened in their passage by cathartics. If magnesia be the agglomerating base, the sulphuric acid will be preferable, as this will have a tendency to convert it into Epsom salts, and thus produce a purgative as well as a solvent effect. [The state of the rectum should always be ascertained, and, by throwing a clyster up it, it will generally be easy to learn whether any obstruction exist within it; or, if requisite, an examination

GEN. X.
SPEC. II.
Enterolithus Calculus.

In man, produced by an injudicious use of calcareous earths.

Illustrated.

Curative process.

* In some instances, carbonate of iron has accumulated in the bowels, and produced concretions. Hence, when this medicine is given, Dr. Elliotson recommends particular care to be taken to keep the bowels open; if you attend to this point, an immense quantity of the carbonate of iron may be given without inconvenience. The same physician relates a case of tetanus successfully treated, where a man took nearly two pounds of it every day for some days, and he regularly voided large lumps of it, clysters being given to make their passage free from pain. Dr. Elliotson had another patient labouring under tetanus, to whom he gave this remedy also with success; but, if purgatives were not regularly administered, pain was experienced in the rectum from the accumulation of the iron in it, which required to be picked out. Some years ago, when it was the fashion to cram the alimentary canal with mustard-seed to obviate costiveness, considerable masses of it frequently collected in the bowels, and produced serious disorder. — Ed.

† Edin. Med. Comment., vol. viii. p. 329. Amongst the poor in Scotland, who eat oaten bread, Dr. Marcet found that intestinal concretions occur, with a nucleus of vegetable fibres, manifestly consisting of oats. An analysis of one of these concretions furnished of

| | |
|-------------------------------|---------|
| Animal matter | - 25.20 |
| Resin | - 3.90 |
| Ammoniaco-magnesian phosphate | - 5.16 |
| Phosphate of lime | - 43.34 |
| Vegetable fibre | - 20.30 |

97.90— Ed.

GEN. X.
SPEC. II.
Enterolithus Calculus.

may be made with the finger or instruments. It is not at all uncommon for the concretions to pass as far as the rectum, before they stop.]

If we have reason to suspect a calcareous diathesis as a sole cause, since this diathesis usually depends upon debility, we must endeavour to invigorate the system generally, and the stomach more particularly, by the course of regimen and medicines already prescribed under DYSPEPSY.*

SPECIES III.

ENTEROLITHUS SCYBALUM.

SCYBALUM.

CONCRETION SOAPY OR UNCTUOUS; MOSTLY CONTINUOUS; SOMETIMES IN LAYERS; SPHEROIDAL OR OBLONG; CONSISTING CHIEFLY OF MUCUS OR OLEAGINOUS MATTER, MORE OR LESS INTERMIXED WITH INDURATED FECES.

GEN. X.
SPEC. III.
Has been hitherto little attended to.

THIS species has not hitherto been sufficiently attended to; and even Fourcroy and Walther seem to have mistaken it for a biliary calculus; an error, which the writer has seen in several instances repeated in this metropolis. The specific character sufficiently expresses the general nature of the concretion, and is drawn up from various examples that have occurred to himself, or have been shown him by others.

Three sorts peculiarly noticeable.

The concretions belonging to this species, if carefully watched and analysed, would probably be found very numerous; but, in the present state of our knowledge upon this subject, we must confine ourselves to the three modifications of feculent, oleaginous, and ambraceous, or that of ambergris.

Feculent or common scybala.

When, from a feeble peristaltic action, the feces have remained long in the colon, they are frequently found to undergo a considerable change; for they become harder as their more liquid parts are absorbed; and, in consequence of becoming harder, frequently stimulate the mucous glands, by which they are surrounded, to a more copious secretion, which intermixes with them; and, as they break into indurated balls or fragments, gives them a less rough or a more greasy or unctuous feel. These are the common scybala of medical writers.

Oleaginous scybala.

But we occasionally meet with balls, buttons, or globules of a still more cetaceous, fatty, or oily substance, discharged, sometimes solitarily, sometimes gregariously, from the rectum, of very

* Marcet, Essay on the Chemical History and Medical Treatment of Calculous Disorders, 1817.

different diameters.* Occasionally we can trace them to a like origin, as in a case quoted by Sir Everard Home† from Dr. Babington, in which the lady who voided them had regularly, before their appearance, taken one or more doses of olive-oil to appease severe pains in the stomach which were ascribed to the passing of gall-stones, for which these concretions were at first altogether mistaken. They were of a globular form, “varying in size from that of a small pea to the bulk of a moderate grape, of a cream-colour, and slightly translucent, of a sufficient consistence to preserve their form, and to bear being cut with a knife, like soft wax.”

GEN. X.
SPEC. III.
Enterolithus Scybalum.

In general, however, we cannot trace these concretions to any unctuous material introduced into the stomach; and have reason to believe them produced by intestinal secretion, or a chemical change effected on the recrement of the food after it has passed into the larger intestines. Dr. Babington has also furnished, in the same article, a case, which can only be resolved into an origin of this kind. The patient was here a little girl of four years and a half old. At the age of three, “her mother observed something come from her as she walked across the room, which, when examined, was found to be fat in a liquid state, and which concreted when cold. Ever since that time to the present she has voided, at intervals of ten or fourteen days, the quantity of from one to three ounces, sometimes pure, at others mixed with feces: when voided, it has an unusually yellow tinge, and is quite fluid like oil. Her appetite is good, as well as her spirits, and her flesh firm; her belly rather tumid, but not hard: she is subject to occasional griping.”‡ A free evacuation of the same kind occurred to Dr. Kuntzmanz of Berlin.§

Globules, and balls of fat, discharged from the rectum, are noticed in various medical collections of high authority both domestic and foreign.||

Thus, in the Edinburgh Medical Essays, we have an instance of a whitish substance like tallow or hardened marrow, being a congeries of globules, passed among the excrement, the entire mass making the size of a walnut; other masses having been passed several days afterwards of the size of so many peas.¶ The Paris Academy of Surgery have published similar accounts.** So Dietrich gives the case of a waxy mucous matter—materia ceracea mucosa—passed by the rectum, weighing more than an

Varied in colour or by combination.

* A phthisical girl voided from the bowels numerous concretions, which were found by M. Lassaigue to be composed as follows:—

| | | |
|--------------------------------|---|-------|
| 1. Acid fatty matter | - | 74 |
| 2. Matter analogous to fibrine | - | 21 |
| 3. Phosphate of lime | - | 4 |
| 4. Chloruret of sodium | - | 1—ED. |

† Phil. Trans. year 1813, art. xxi.

‡ Loco citat.

§ Journal der Practischer Heilkunde von Hufeland, July, 1821.

|| In the last volume of the Medico-Chirurgical Transactions, Professor Elliotson has published a valuable paper, containing all that is at present known respecting the discharge of fatty substances from the bowels. The reader will find an abstract of it in the present work, at the conclusion of the section on diarrhoea.—ED.

¶ Vol. i. part ii. art. lxvi. p. 145.

** See especially Hist. de l'Acad. Royale de Chir., iii. p. 14.

GEN. X.
SPEC. III.
Enterolithus Scybalum.

ounce *: and Paulini notices several instances that had fallen within the range of his observation †; in one of which the concretions were of a green hue. Vander Wiel describes a case of the same appearance ‡: and Zeller has found them loaded or covered with hairs §, probably swallowed accidentally. So, in the *Acta Naturæ Curiosorum* ||, we have an instance very like the first of Dr. Babington's cases; the concretions were dejected in a paroxysm of colic, and are described as "excreti globuli, quasi saponacei, cedente dolore hypochondriorum." And I suspect we are to refer to the same species a case ascribed by Dr. Scott, of Harwich, Roxburghshire, to hydatids, or something resembling them. ¶ The patient had for many months been occasionally subject to colic and dyspeptic affections, accompanied with great pain and faintness. He at length "began to void by stool substances of a brown colour, some about the size of nuts, and some as big as walnuts, which were bags that contained matter of a yellow hue like pus, besides a great many empty ones that had broken. I have seen eight or ten passed in one stool." This continued for eight or ten days, and the patient then recovered.

Accompanied with coprostasis obstipata.

In all these cases we find proofs of morbid intestinal action, commonly accompanied with pain and *coprostasis obstipata*, or costiveness from weakness and torpidity in the vermicular movement of the intestines.

Ambraceous scybala, where found chiefly.

It is under like circumstances that the substance, called ambergris, is found in the larger intestines of the cachalot, or spermaceti-whale (*physeter macrocephalus* Linn.), which generally contains sixty per cent. of fat, and is never higher up than six or seven feet from the anus. It appears to be more completely elaborated in proportion as the animal is more sickly and affected with costiveness, and does not dung on being harpooned; and hence, the most valuable, according to the report of the South Sea whalers, is that which is extracted from animals that have died of the complaint. It is found in masses of from fourteen to more than a hundred pounds weight; and appears at first to bear a close resemblance to the feces of the whale, but hardens on exposure to the air. The largest lumps have probably not been discharged, but separated from the body of the animal during the process of putrefaction after death. Neumann gives an account of one mass found on the coast of the island of Tidor, that weighed not less than a hundred and eighty-two pounds.** It was purchased of the King of Tidor, by the Dutch East India Company, in 1693, for eleven thousand dollars, and measured five feet eight inches in thickness. It was long exhibited at Amsterdam, and at length broken up and sold. Other masses of many pounds weight have been found floating on the sea: and the concretions, thus detached and of different bulks, are carried into every quarter by the tides and currents, and have sometimes been found on the shores of the West Indies; whence Waller:

Sometimes in immense masses.

Often found on the coasts.

* Observationes quædam rariores, &c.

† Cent. i. obs. 15.

‡ Stalpart Vander Wiel, cent. i. obs. 61.

§ Dissert. Molæ viriles memorab. Tubing. 1696.

|| Vol. iii. obs. 51.

¶ Edin. Med. Comm., vol. v. p. 183.

** Phil. Trans., vol. for 1734.

Bermuda wall'd with rocks, who does not know
That happy island where huge lemons grow ?
Where shining pearl, coral, and many a pound,
On the rich shore, of AMBERGRIS is found.

GEN. X.
SPEC. III.
Enteroli-
thus Scyba-
lum.

Sometimes
in harpoon-
ed whales,

Sometimes, however, it is traced in great abundance in the intestines of whales that are harpooned, and which, probably, would soon have died of an obstruction in the bowels, if they had not been taken. A captain in the Southern Whale Fishery, examined before the privy council in 1791, related, that he had found three hundred and sixty-two ounces of this substance in the intestines of a female, struck off the coast of Guinea; part of which was voided from the rectum on cutting up the bladder, and the remainder traced in the intestinal canal.* The mass is usually loaded with hard bony fragments, by the seamen called squids, which are the beaks of the cuttle-fish, on which the whale is known to feed.

usually
loaded with
other mate-
rials.

When recently taken, the smell of ambergris is very strong, and rather fetid, but, by keeping, the offensiveness goes off, and it acquires a faint musky odour. It has scarcely any taste. Its colour is ash-gray, or brown, somewhat mottled: its hardness is sufficient to render it easily friable, but not to bear a polish; when broken down, it has a soapy feel like steatite.

Sir Everard Home has endeavoured to account for the production of all these varieties of scybala, and to show that, while it is the office of the stomach and intestines to furnish nutriment for the muscles and membranes out of the finest part of the food which is separated from the rest for this purpose, it is in like manner the office of the larger intestines, and especially of the colon, to convert a considerable part of the refuse matter into fat, by combining it with the bile, and to send it, thus changed in its nature, by channels of which we know nothing, into the circulation, and deposit it in almost every part of the body, to lubricate the whole, and especially to promote the growth of the animal frame in youth.†

How ac-
counted for
by Sir E.
Home.

It is unquestionable that, with all our advances in the knowledge of physiology, we are, to this hour, in great ignorance of the means by which the fat of the different parts of the body is produced, or the quarters from which it is drawn. But it militates against the hypothesis before us, that we have no instance of the existence of fat in the larger intestines when they are in a state of health; and that to produce scybala of every kind, and particularly those that are more oleaginous, a weak and diseased condition of the intestinal canal appears to be indispensable. Whilst in the second case related by Dr. Babington, in which the fatty material seems to have been elaborated in its most perfect state, the bile does not appear to have been at all transformed from its natural to any new character, nor indeed to have been in any degree operated upon; for we are expressly told, that the material when voided had "an unusually yellow tinge," notwithstanding that it was "quite fluid like oil."

Objection
to the hy-
pothesis.

The subject, however, is worth pursuing: and Sir Everard has endeavoured to support his views by a later article inserted in the same work, on the transmutation of the tadpole into a frog‡, in

Hypothesis
supported
by the
transmuta-
tion of the
tadpole.

* Phil. Trans., vol. lxxxi.

† Ib. for 1813, art. xxi.

‡ Ib. for 1816, p. 301.

GEN. X.
SPEC. III.
Enterolithus Scybalum.

which, after showing that the intestines of the tadpole are much larger and more complicated than those it possesses in its frog state, he argues, that this more extensive and elaborate machinery is for the purpose of forming a larger abundance of oleaginous matter as food, at a period when the animal is less capable of obtaining food from without; and he observes further, that the intestinal canal of the tadpole is surmounted with, and, in some species, imbedded in fat.

GENUS XI.

HELMINTHIA.

INVERMINATION. WORMS.

WORMS OR LARVÆ OF INSECTS, INHABITING THE STOMACH OR INTESTINES.

GEN. XI.
The subject new to nosological classifications.

THE subject of our last genus, I observed, was new, or nearly so, to the science of pathology: that of the present is equally new to nosological arrangement; for, it is a singular fact that, while almost all systems contain a distinct genus under the name of phthiriasis, or malis, or cocyta, and some of them two distinct genera, for the purpose of arranging such insects, larvæ, or vermicles as are occasionally found infesting the surface of the body, and which, to avail ourselves of a significant term derived from old English botany, may be called animal *dodders*, few or none of them comprise any division whatever for intestinal larvæ or worms, notwithstanding the infinitely greater mischief they often produce, and the far greater difficulty of getting rid of them.*

Dr. Cullen sensible of the omission, and intended to supply it.

Dr. Cullen, indeed, in the latter part of his life, was sensible of the importance of this omission, and would most probably have corrected it in his own system, had he found leisure or inclination for a revisal of it, since he has introduced the term *YERMES* into

* Every kind of animal has its *entozoa*, or internal parasites, which are peculiar to itself, just as it has its *ectozoa*, or external ones. The number of species of *entozoa* is therefore considerable, and their study constitutes an important branch of zoology. Cruveilhier thinks it more practically useful to divide the entozoa of the human race, as Linnæus did, according to the situations which they occupy: first, into such as are developed in cavities communicating with the external air (intestinal worms); and into others, which lie imbedded in the very substance of organs (visceral worms). This division seems to Cruveilhier more advantageous to the physician than that of Rudolphi, who very scientifically distinguishes entozoa, by the varieties of their form, into *nematoides*, *acanthocephala* (found chiefly in the intestines of swine), *trematoda*, *cestoides*, *taniæ*, or tape-worms, and *cystica*, or hydatids. (*Entozocrum sive Vermium intestinalium Historia*. Amstel. 3 vols. 8vo. 1808. fig. and *Entozoorum Synopsis* Berol. 1819. 8vo.) Cruveilhier also prefers the division adopted by Linnæus to that proposed by Cuvier, who arranges entozoa into two classes; one characterised by a digestive cavity (*entozoaires cavitaires*), and another by their *parenchymatous* structure. — Ed.

his "*Catalogus Morborum*, a nobis omissorum, quos omisisse fortassis non oportebat."

In many instances, however, physiologists and pathologists have abundantly supplied the deficiency; for, there is scarcely a disease of any kind, which has not been referred by some of them to vermination as its origin. This is particularly true of the school of Linnæus, though it is not confined to that seminary. Thus, Linnæus himself laboured hard to prove, that dysentery is the effect of a peculiar larva or grub belonging to the *acarus* or tick genus, which he has ventured to introduce into his Natural History under the name of *acarus dysentericæ*. So Kircher has ascribed the plague to another kind of animalcule; Langius, the measles; various authors, the itch; Siggler, petechiæ; Lusitanus and Poncellus, small-pox; Dessault, lyssa, or canine madness; Hauptman, syphilis; Martin and Udman, both pupils of Linnæus, elephantiasis; and Nyander, another pupil of the same great teacher, contagious diseases of most, if not of all kinds. Some, again, have ascribed piles to the same source; others, the inspissated and vermiform mucus squeezed out occasionally from the excretory ducts of the small mucous glands of the forehead, in the present system described under the genus and species *ionthus varus*; and others again, the tooth-ache: which last opinion seems at one time to have been adopted generally; for we find Shakspeare making one of his best-drawn characters exclaim—

What! sigh for the tooth-ache!
Which is but a humour or a worm.

It is not very wonderful, therefore, to behold the extensive use to which the *tænia hydatidis*, or hydatid, is applied in modern times, so as to be regarded as the parent of almost every lymphic cyst discoverable in the body; nor that cancer of the breast should be ascribed to a similar generation; and the less so, since it is not a century ago, that it was gravely argued by the most enlightened physiologists of the day, and supposed to be ocularly and irrefragably demonstrated, that man himself is, in every instance, the progeny of a similar kind of maggot, which, it was said, might be seen by any one who would take the pains to look for it, vivaciously frolicking in the vast ocean of a drop of male semen.

We are, at length, approaching to more sobriety in our observations and enquiries; and it is high time such a period should arrive; for we were in great danger of running into the wildest fancies of equivocal generation, and of equally relinquishing all principles and all limits in natural history. We now know, that an incipient stage of putrefaction, or a very short quiescence and exposure of animal fluids to a warm atmosphere, is sufficient to load them with animalcules of some kind or other; not, indeed, by fortuitously converting the constituent and decomposing principles of such fluids into the simple forms of microscopic life (for of this we have no proof whatever), but rather, by affording to some few of the myriads of invisible ovula with which the atmosphere swarms, and which it may convey to them, the proper nidus, or the quickening stimulus they stand in need of. [The hypothesis of worms

GEN. XI.
Helminthia.

The omission abundantly atoned for by pathologists; especially of the Linnæan school; who have referred most diseases to vermination.

Extensive application of the *tænia hydatidis*.

Man himself once supposed to arise from a like source.

Mischief of indulging in such extravagances of physiology.

Real origin of such parasitic animalcules.

Invisible eggs floating in the atmosphere.

GEN. XI.
Helmin-
thia.

Proof of the
assertion.

Blight in
hop-
grounds.

Honey-,
dew, what.

Favourite
food of the
aphis
humuli.

Ovula float-
ing in the
atmosphere
probably
incalculably
less than
those of the
aphis.

The same
fact found
in the mi-
neral as in
the atmo-
spherical
kingdom.

Found also
occasionally
in build-
ings.

Possibly in
abscesses
and exan-
thems.

Hence ani-
malcular
eggs are
perhaps
capable of
being

being the product of putrefaction only proves, that the believers in it had never examined the generative organs of those animals.*]

That the atmosphere is freighted with myriads of insect-eggs that elude our senses, and that such eggs, when they meet with a proper bed, are hatched in a few hours into a perfect form, is clear to any one who has attended to the rapid and wonderful effects of what, in common language, is called a blight upon plantations and gardens. I have seen, as probably many who may read this work have also, a hop-ground completely overrun and desolated by the *aphis humuli*, or hop green-louse, within twelve hours after a honey-dew (which is a peculiar haze or mist loaded with a poisonous miasm) has slowly swept through the plantation, and stimulated the leaves of the hop to the morbid secretion of a saccharine and viscid juice, which, while it destroys the young shoots by exhaus-
tion, renders them a favourite resort for this insect, and a cherishing nidus for the myriads of little dots that are its eggs. The latter are hatched within eight-and-forty hours after their deposit, and succeeded by hosts of other eggs of the same kind; or, if the blight take place in an early part of the autumn, by hosts of the young insects produced viviparously; for, in different seasons of the year, the aphis breeds both ways.

Now, it is highly probable, that there are minute eggs, or ovula, of innumerable kinds of animalcules floating by myriads of myriads through the atmosphere, so diminutive as to bear no larger proportion to the eggs of the aphis than these bear to those of the wren, or the hedge-sparrow; protected at the same time from destruction by the filmy integument that surrounds them, till they can meet with a proper nest for their reception, and a proper stimulating power to quicken them into life; and which, with respect to many of them, are only found obvious to the senses in different descriptions of animal fluids. The same fact occurs in the mineral kingdom; stagnant water, though purified by distillation, and confined in a marble basin, will in a short time become loaded on its surface or about its sides with various species of *confervæ*; while the interior will be peopled with microscopic animalcules. So, while damp cellars are covered with boletuses, agarics, and other funguses, the driest brick walls are often lined with lichens and mosses. We see nothing of the animal and vegetable eggs or seeds by which all this is effected; but we know, that they exist in the atmosphere, and that this is the medium of their circulation. How far the tales may be true, of living animals found in abscesses in different parts of the body, and especially in scirrhus and pustulous exanthems, this is not the place to enquire; but, conceding the fact, we can only account for it by supposing their respective ovula to have been admitted into the system with the air or food we take in; and to have been separated as soon as they acquired possession of a proper nursery.

We have strong reason to believe, however, that many of the eggs or animalcules that are traced in animal fluids, occasionally find other receptacles out of the body that answer their purpose as well, and seem to keep up their respective species; and, consequently, that provide a stock of eggs, larvæ, or insects, prepared

* Merat, in Dict. des Sciences Méd., tom. lvii. p. 215.

to take possession of any decomposing animal substance as soon as it is ready for their reception. And we are hence able to account for the presence of animalcules in such situations, without being driven to the necessity of supposing them to have been generated therein; and see how it is possible that they should continue to exist in a regular chain of succession, instead of being produced anomalously and equivocally by the *bildungstrieb* (as the German physiologists call it), or formative effort of a living principle, in substances in which life has confessedly ceased to exist.

Thus Rolander, who, like Linnæus, ascribed dysentery to the dysentery-tick, or *acarus dysenterice*, and who himself laboured under this disease while residing in Linnæus's house, contended that he had discovered the same insect in a water-vessel made of juniper-wood; and conceived that it was conveyed in great numbers into his body by the water which he drank from the cistern. So Lister affirms, that he has seen the *ascaris vermicularis* (the maw or thread-worm), which is usually found burrowing in the lower part of the intestines, infesting the surface as well. In like manner Palmærus has rendered it at least probable, that the young, or ova of the *fasciola hepatica*, or fluke, found so abundantly in the liver of sheep that die of the rot, and the origin of which has so much puzzled the naturalists, are swallowed by the sheep in marsh or stagnant waters. And Linnæus himself pointed out, that the *tænia solium*, or tape-worm, the cause of whose existence in the alvine channel has been a source of equal difficulty to the physiological enquirer, exists, though much smaller, in muddy springs; and notwithstanding that Pallas, at first, expressed doubts upon this point, the assertion has been since confirmed by additional and satisfactory observations.*

[The *ascaris vermicularis*, which is usually considered peculiar to the human body, is alleged by Dr. Barry, of Cork, to be derived from without; as worms, differing from it merely in colour, were traced by him, in one instance, to the well of a particular country-house, two miles from Cork, where the whole family, and every other person that drank the water, invariably became afflicted with ascarides.† One argument, with which all statements of this kind are generally met, is, that intestinal worms cannot live out of the body, and therefore they must differ from worms, more or less

GEN. XI.
Helmin-
thia.

hatched in
other sub-
stances than
animal
fluids.

Animal-
cules not
necessarily
produced
by spon-
taneous ge-
neration.

The opi-
nion illus-
trated by
discoveries
in natural
history.

Rolander.

Lister.

Palmærus.

Linnæus.

* This statement disagrees with the observations of Bremser, Rudolphi, and Cruveilhier. — Ed.

† Barry on the Origin of Intestinal Worms; see Trans. of the Association of Physicians, &c. Ireland, vol. ii. p. 389. It was the opinion of Linnæus, that intestinal worms were merely terrestrial or aquatic ones, swallowed either completely formed, or in the state of ova, or germs. But, against this doctrine, it is argued, that, if it had a good foundation, worms precisely similar to those met with in the human alimentary canal, would also be found out of it; as indeed Linnæus and others maintain is actually the case. But if, as Bremser has done, who devoted twelve years of his life to the study of entozoa, we strictly enquire into the facts brought forward, we shall find them to be vague, carelessly observed, and generally adduced by persons unacquainted with helminthology. Hence, Cruveilhier lays it down as an axiom, that *worms, like intestinal worms, have never been met with out of the bodies of man and other animals, unless discharged from them.* And, another proposition which he considers completely established, is, that *no terrestrial or aquatic worms have ever been met with alive, in the bodies of man and other animals, unless they had been very recently introduced into them.* — Ed.

GEN. XI.
Helmin-
thia.

resembling them, found elsewhere: yet, it is possible to conceive, that an animal that is hatched and attains its growth in a particular temperature, unexposed to the air, may not be able to sustain the sudden removal from its warm sheltered nursery, though it might have thriven in a much colder and more exposed situation, had it never been made too tender by the influence of habit, &c. Worms of the human intestines die, not only soon after their discharge from the body, but frequently even before they are voided, when the health of the individual is much disordered by fevers. They also invariably perish with the patient; when the supply of their wonted nutriment may be supposed to cease, and the temperature to which they are accustomed is rapidly lessened. Some writers state, that worms never meddle with the alimentary matter in the bowels, but derive their nutriment by suction from the substance, or vessels of the viscera; while others represent those worms, which occupy the small intestines, as feeding on the chyle itself. The editor is not aware, that any decisive evidence, exclusively supporting either of these opinions, is on record.]

Doubts
upon the
subject,
whence
derived.

First, from
the different
appearances
of the same
animal in
different pe-
riods of life.

Examples.

Secondly,
from a dif-
ference of
appearance
produced
by a dif-
ference of
food.

Examples.

Is it not surprising, that doubts should at times exist in the mind of the precise and cautious enquirer in many cases of this kind, which can only be removed by a long and attentive investigation of the history of the minute animals which gives rise to them? for, first, the very same species assumes so different an appearance in different stages of its existence, that nothing but the most patient prosecution of the same individual through all his metamorphoses, could induce us to put any faith in its individuality. For who, for example, if he did not know it by the repeated experience of himself or of others, could believe that the black and the white carrion-vulture of America (*vultur aura* Linn.), which, when teased, emits a cry like a mouse, are the same bird, merely changing from white to black as it grows old? Who could divine that the tadpole, possessing gills and a fish-tail, and without legs, should be the same animal, only younger, as the four-legged frog that has neither tail nor gills? or that a like identity should apply to the caterpillar, the aurelia, and the winged moth? But, secondly, we often see an almost equal change produced in a few generations of the same species, and occasionally in the same individual, by a change of food or habitation, or both. How widely different is the domestic sheep from the argali; or the ox from the bison! yet these are the stocks from which they have proceeded. A difference of food alone produces a growth and development of sexual organs in the honey bee, and converts what have hitherto been called neuters (but which are really imperfect females) into queens, or bearing bees. In many instances, we can trace changes as considerable (and shall presently have occasion to remark them) in worms, or the larvæ of insects, introduced accidentally into the human intestines from without. Several of these, however, are animals with the whole of whose history we are acquainted: but we are not acquainted with the whole of the history of the ascarides, the tæniæ, and various other intestinal worms; and hence might not know them out of the body, even though we should actually meet with them under some form or other.*

* These remarks, however ingenious, are not in agreement with what is now taught by some of the best pathologists. It has often been suspected (and

As animalcules are parasitic to plants, so are plants at times parasitic to animals. As I have seen, fungi spring up night after night on the sheets of patients with gangrenous limbs, where the corrupt discharge has soaked into the sheets, and rendered them a quickening nidus. Several species of clavaria grow on the chrysalis of one or two species of cicada, and even on the perfect insect itself, as others do on the May-fly.* Were this indeed the proper place for pursuing so interesting a study, I could show, not only that there is scarcely an animal of any class or order, from the highest to the lowest, but is a prey to other animals of a minuter form that infest its interior as well as its surface, but that there is scarcely a vegetable which has not also its parasitic plunderers, and is infested in like manner. But the subject would

GEN. XI.
Helmin-
thia.
Plants pa-
rasitic to
animals.

Boerhaave himself entertained the opinion) that, when aquatic or terrestrial worms pass into the alimentary canal, the new medium in which they live, their entirely novel condition, may account for their metamorphoses, not more extraordinary than those of the tadpole and insects. In refutation of this notion, while Cruveilhier admits the influence of external circumstances on every thing that has life, he joins M. Edwards in declaring such influence to be subordinate to the omnipotent action of race and species. The view, which he takes of this subject, is supported by various considerations:—

1. The *structure* of intestinal worms has not the most distant resemblance to that of worms which live in the earth or water. 2. Why are not the same kinds of worms met with in all the species of animals, and why, on the contrary, has each species intestinal worms which are peculiar to it? 3. Why, in the same animal, does the same kind of worm constantly dwell in one particular part of its alimentary canal? 4. How does it happen, that the intestinal worm perishes almost as soon as it is voided from the alimentary canal, just as the terrestrial or aquatic worm dies immediately it has entered the digestive tube? 5. How, in the hypothesis professed by Boerhaave, and to which our author inclines, would it be possible to account for the almost interminable reproduction of intestinal worms, if the animal's body within which they multiplied were not the medium they were destined for? But in the same manner as certain larvæ of insects, introduced into the alimentary canal of certain animals, find here alone the only requisites for their development, why should not human intestinal worms proceed from the introduction of particular germs into the alimentary canal, which in any other situation could not thrive? This question suggested itself to Cruveilhier by a case, in which a very large caterpillar was alleged to have been voided with the feces, and on which occurrence both Cruveilhier and M. Jules Cloquet were consulted. The latter communicated his opinion of the circumstance in a note:—"The animal shown me is the caterpillar of a moth, perfectly developed, and ready to be transformed into a chrysalis. If it has been discharged *alive* by vomiting; it must have been swallowed by the patient immediately before its ejection. If really swallowed, its magnitude prevents us from supposing that this could have happened inadvertently; nor could this have taken place when the larva was but of trivial size, because its *organisation would have formed an impediment to its living and growing in the intestinal canal.*" (See Dict. de Méd. et de Chir. Pratiques, art. ENTOZOAIREs.) Cruveilhier considers this the most rational explanation which the case admits of, and the only circumstance that rather shakes his confidence in it, is what happens in the horse with respect to the ova of the œstrus or common gadfly; a subject hereafter touched upon. Dr. Elliotson once saw two centipedes, said to have been vomited by a girl twelve years of age; the animals had lived three days when he saw them. If they were truly swallowed, and lived any considerable time in the stomach, the fact is curious; because these insects one would not expect to be capable of living long in the fluids of the stomach.

—ED.

* Mémoires sur des Insectes sur lesquelles on trouve des plantes, par M. Fougeroux de Boudery. Vide Hist. de l'Académie Royale des Sciences, an 1769.

GEN. XI.
Helmin-
thia.

carry us too far: yet a few additional hints in relation to it are given in the comment to the Nosological System, and those who are desirous of extending the study may turn to them at their leisure.

[Worms are said to prevail in the greatest degree amongst the poor, dirty, ill-fed classes of society, and particularly in persons who reside in damp marshy countries. According to M. Fortassin, the *tænia* is very frequently met with in butchers and others, who deal in new-killed animal substances. Persons in the habit of taking a good deal of wine, and other spirituous liquors, are rarely afflicted with worms. Infants also, while they take no other food but their mother's milk, seldom have them. These circumstances, having a close reference to the causes of worms, a subject that is yet very obscure, seem well-deserving of the reader's attention; but stand in need of further confirmation.]

Different
arrange-
ment of hu-
man worms
by different
writers;
but none
sufficiently
correct.
New ar-
rangement
proposed.

The various kinds of worms, traced in the human stomach and intestines, have been differently arranged by different writers: but they have been chiefly assorted into *round* and *flat* worms; or into *indigenous* and *exotic*: in other words, into those which we are told are *generated* in the alvine channel, and those which enter it *from without*. The first method is too limited; and the second, as we have already seen, not only hypothetical, but built on a false basis; for we have reason to believe, that every species, found in this channel, primarily existed out of it.* In unfolding, therefore, the subject further, we shall employ a different arrangement, and comprehend, under the genus *HELMINTHIA*, three species of diseases, equally distinguished from each other by symptoms, and by the different tribes of animals which give rise to them; viz. those which are nourished and find a proper habitation throughout every part of the alvine canal; those whose proper habitation is limited to the extremity of the canal; and those which have no proper habitation in any part of it, and enter it erroneously or by accident.

- | | |
|---------------------|----------------|
| 1. HELMINTHIA ALVI. | ALVINE WORMS. |
| 2. ————— PODICIS. | ANAL WORMS. |
| 3. ————— ERRATICA. | ERRATIC WORMS. |

* Some of the facts and arguments brought forward by Bremser (*Traité Zoologique et Physiologique sur les Vers Intestinaux de l'homme, avec des notes de Blainville, Paris, 1824, 8vo.*) and by Cruveilhier, against the side of the question taken by Dr. Good, have been adverted to in the preceding notes.
— Ed.

SPECIES I.

HELMINTHIA ALVI.

ALVINE WORMS.

WORMS EXISTING AND FINDING A PROPER NIDUS IN THE STOMACH OR ALVINE CANAL, CHIEFLY OF CHILDREN, AND SICKLY ADULTS; PRODUCING EMACIATION, A SWELLED HARD BELLY, GNAWING OR PUNGENT PAIN IN THE STOMACH, PALE COUNTENANCE, FETID BREATH, AND IRRITATION OF THE NOSTRILS.

THE worms that chiefly infest this region, and produce these symptoms, may be arranged under the following varieties :

GEN. XI.
SPEC. I.

| | |
|--------------------------------|-------------------|
| α Ascaris lumbricoides. | Long round-worm. |
| β Trichocephalus. | Long thread-worm. |
| γ Tænia solium. | Long tape-worm. |
| δ Tænia vulgaris. | Broad tape-worm. |
| ϵ Fasciola. | Fluke. |

[So common are certain worms in the human subject, that, it is calculated, one half of the total number of children have either the round or thread-worm. Tænia is more rare, however; so that an estimate has been made, that, in France, only one individual in a hundred suffers from it.* Worms are often only of one kind, and most frequently of the long round species; yet it is not very uncommon to find two species existing together in the alimentary canal. The records of medicine furnish examples of patients, who even voided simultaneously ascarides, tæniæ, and lumbricoides. Generally speaking, the smaller the worms, the more numerous they are; and the tænia, the largest, has received the epithet of *solium*, from the supposition, that it is always solitary, which was the notion of Hippocrates; but this is a mistake, for, in the human subject, several may be met with together, and, in animals, and especially in the canine race, tape-worms sometimes exist together in great numbers. It was Bremser's belief that an entire tape-worm had never been seen, as the caudal articulations, which are loaded with fecundated ova, break off, and are discharged, before the complete developement of the joints towards the head.]

The head of the LONG ROUND-WORM is slightly incurved, with a transverse contraction beneath it; mouth triangular; body transparent, light yellow, with a faint line down the sides; gregarious and vivacious; from twelve to fifteen inches long. Inhabits principally the small intestines of thin persons, generally about the ileum, but sometimes ascends into the stomach, and creeps out of the mouth and nostrils: occasionally travels to the rectum, and passes away at the anus. Frank notices an instance of eighty of these worms rolled up into a ball, and expelled during a fever;

α H. Alvi.
Ascaris
lumbrico-
ides.

* Dict. des Sciences Méd., tom. lvii. p. 215.

GEN. XI.

SPEC. I.

α. H. Alvi.

Ascaris

lumbrico-

coides.

and gives another case, in which the whole intestinal canal, from the duodenum to the rectum, was crammed with them.*

[They sometimes quit the alimentary canal, and lodge in some adjacent part. MM. Andral and Blandin met with one example, in which a long round-worm had insinuated itself into the cavity of the larynx, and lay between the two chordæ vocales. The patient, a child, had been suddenly seized with extreme difficulty of breathing, and very shortly died of suffocation. M. Andral was shown, by M. Guersent, a liver that had been, as it were, pervaded in different directions by long round-worms, which had passed from the duodenum into the liver, through the ductus choledochus. Andral was acquainted with only one additional fact of this kind; it is recorded in the Bulletins de la Faculté de Méd. de Paris.

Long round-worms, in a few rare cases, pass through a perforation in the bowels, get into the peritoneum, and either remain there, or are discharged through a cutaneous fistula, or insinuate themselves into the bladder or vagina.

May pass
through
perforations
in the
bowels.
How such
perforations
are made.

With regard to the questions, whether these worms can only pass from the intestines into another organ, through an accidental opening already existing? or whether they sometimes form the passage themselves? M. Andral is of opinion that, if the latter case ever take place, it must be extremely rare. As the *ascaris lumbricoides* cannot live out of the alimentary canal, it is fair to presume that, even if it had the power of perforating the coats of the intestine, and getting out of it, the instinct of self-preservation would hinder it from doing so. Yet the same author conceives, that this may not be the case after the death of the animal, in which an *ascaris lumbricoides* is developed, and that the latter may then have a greater inclination, than during life, to make its way through the parietes of the bowels.† The disturbance of the constitution by a severe attack of fever seems to extend its effects to these inhabitants of the digestive canal, as the frequency of their evacuation, during such illness, is well known.‡]

Habits and
effects.

This animal will sometimes remain so quiet in its proper region, as to give no signs of its existence but by its discharge. Frequently, however, it is a troublesome and mischievous intruder, producing an intolerable feeling of faintness, great emaciation, and most of the symptoms enumerated under the specific definition. In its general appearance it bears so striking a resemblance to the earth-worm (*lumbricus terrestris* Linn.), that by many naturalists it has been regarded as the same. Yet, to an attentive observer, there is a considerable difference both in their form and movements.§ The body of the intestinal worm is round, its colour is a

How differs
from the
earth-
worm.

* De Cur. Morb. Hom. Epit., tom. vi. lib. 6.

† Précis d'Anat. Pathol., t. ii. p. 181. Cruveilhier joins Rudolphi and Bremser in rejecting the opinion, that intestinal worms ever form the perforation themselves, and believes that when they pass through the coats of the bowels, it is in consequence of an aperture having been first produced by ulceration. See Dict. de Méd. et de Chir. Pratiques, art. ENTOZOAIRE.

‡ Dr. Gaspard mentions an epidemic remittent and intermittent fever, that occurred in France in 1826, with peculiar severity. The discharge of living intestinal worms, with copious quantities of bile, was a common occurrence in it. In one case, true caterpillars were also voided, both from the stomach and rectum. — Magendie, Journ. de Physiol., tom. ix. p. 230.

§ See Baillie's Morbid Anatomy, Hooper on Intestinal Worms, Mem. Lond. Med. Soc., vol. v.; and Bremser's Treatise, already referred to.

pale red, its head is furnished with three vesicles placed triangularly, and, in moving, it curls its body into circles, from which it extends its head. The earth-worm is flat towards the tail, and has bristles on its under side, which it can erect at pleasure. Its colour is dusky red; its head has but one vesicle, and it moves by a continuous course of action propagated from ring to ring.

[Morbid anatomy throws no light on the causes of the formation of the *ascaris lumbricoides*, which occurs in every possible organic condition of the bowels: they may be red or pale, dry, or full of mucous secretions. Around the places in which many worms collect, the intestine is frequently red, while the group of worms itself is often enveloped in a mass of mucus*; but these appearances are to be entirely referred to the worms acting as foreign bodies, and have nothing to do with their production.]

The body of the LONG THREAD-WORM is elastic and contorted, the hinder part thick, the anterior capillary twice as long as the thick part, and terminating in so fine a point, that the mouth is scarcely discernible; its upper surface subcrenated; its lower smooth; it sucks with its small capillary extremity; is from an inch and a half to two inches in length; finely striate on the fore-part; in colour resembles the preceding; gregarious, and found chiefly in the intestines of sickly children; generally in the cæcum. Roederer and Wagler found a large quantity of trichocephali in the colon. They are found also in many animals, besides man, as the horse, boar, fox, and mouse. The male may be distinguished by the curved shape of its posterior extremity. In its slender body a straight alimentary cavity is seen, with spermatic vessels, or oviducts, around it.

In the LONG TAPE-WORM the articulations are long and narrow, with marginal pores by which it attaches itself to the intestines, one on each joint, generally alternate; ovaries aborescent; head with a terminal mouth surrounded by two rows of radiate hooks or holders; and a little below, on the flattened surface, four tuberculate orifices or suckers, two on each side; tail terminated by a semicircular joint without any aperture; from thirty to forty feet long, and has been found sixty. Inhabits the intestines of mankind, generally at the upper part, where it feeds on the chyle and juices already animalised. It has also been found in the stomach†;

GEN. XI.
SPEC. I.
α H. Alvi.
Ascaris lumbricoides.

Appearances of the intestine after death.

β H. Alvi.
Trichocephalus.

γ H. Alvi.
Tænia solium.

* Andral, vol. cit. p. 183.

† Since this sheet was sent to press, the editor, through the kindness of Mr. Docker, formerly an eminent surgeon at Canterbury, has been informed of an extraordinary case, now under the care of Mr. Law of Penrith, Cumberland, in which the bladder is the seat of tænia. The patient is a young woman, about twenty years of age, and first felt a sensation, like a rupture of the bladder, when in the act of stooping to cut corn, in August, 1829. After this, she began occasionally to have discharges of bloody urine, with the sensation of something moving in the bladder, more particularly after each evacuation. In October, 1830, some consideration of the symptoms led Mr. Law to try turpentine both by the mouth and in injections. Great irritation ensued, but eight joints of a tænia were discharged from the meatus urinarius *alive*. Opiate injections were then tried, which, having been persevered in for three days, seemed to put an end to all motion of the worm; and by an expansion of the meatus, its discharge was effected in large quantities; but in so decayed and broken a state, that its parts could not be numbered; but Mr. Law is certain that there could not be less than two thousand joints. With these there was much hemorrhage, and discharge of membranous and other substances, like pieces of liver. A period of tranquillity now followed, and lasted until January, 1831, when she began to suffer again, and

GEN. XI.
SPEC. I.
γ H. Alvi.
Tænia
solium.

Genuine
character.

δ H. Alvi
Tænia
vulgaris.

is sometimes solitary, but occasionally in considerable numbers; and adheres so firmly to the intestines, that it is removed with great difficulty. [It is seldom met with in France, where the broad tape-worm prevails; but it is common in Italy and Saxony.* While the *ascaris lumbricoides*, the *trichocephalus*, and *ascaris vermicularis*, are most common in children, the *tænia* is chiefly noticed in adults.] The animal is oviparous, and discharges its numerous eggs from the apertures on the joints. Werner asserts, that it is hermaphrodite. The broken-off joints have, when discharged, the appearance of gourd-seeds: and it is hence denominated gourd-worm by many medical writers; and is the *lumbricus cucurbitinus* of Dr. Heberden. Dr. Sibbarngaard gives the case of an adult female patient, who was infested with a tape-worm of enormous length, measuring not less than thirty-eight yards, or one hundred and fourteen feet. It was expelled from the anus, after three doses of a bolus, consisting of two drachms of tin filings and half a drachm of jalap mixed up with honey, had been taken.†

The articulations of the BROAD TAPE-WORM (*bothriocephalus*) are short and broad, with a pore in the centre of each joint, and stellate ovaries round them: body broader in the middle, and tapering towards both ends; head resembling the last, but elongated, marked with two lateral depressions, and not provided with a neck; tail ending in a rounded joint. [The anterior joints are like plaits, but the posterior ones are very distinct. The apertures, which in the long tape-worm are situated at the edges of the articulated parts, here lie in their centre. These peculiarities in the *bothriocephalus*, certainly justified Bremser in setting it down as a particular genus. But, as an additional reason for doing so, it may be observed, that it infests almost exclusively the Russians, Poles, Swiss, and the natives of certain parts of France; while the long tape-worm resides in the small intestines of other Europeans and the Egyptians.‡] Like the last, inhabits the upper part of the intestines, and feeds upon the chyle; generally from three to fifteen or twenty feet long: usually in families of three or four. [Rudolphi had a specimen, the rings of which were an inch in breadth. Boerhaave assures us, that he succeeded in discharging

voided, with the aid of turpentine, in the course of eight or nine months, one thousand two hundred and thirty-nine joints; and, subsequently, an immense number of others. Mr. Law has in his possession one portion, consisting of twenty-nine joints. As this case will, no doubt, be published before the completion of this edition, the editor will merely add, that he has examined some of the portions of *tænia* voided, and that no doubt can be entertained of the facts above specified. Drs. Elliotson and Carswell have also examined the specimens, with the reality of which they are entirely satisfied. — Ep.

* Merat, in *Dict. des Sciences Méd.* tom. lxxvii. p. 227.

† Societatis Medicæ Havniensis Collect. vol. ii. 8vo. Van Doeveren mentions an instance in which a portion of *tænia* was voided, 150 feet long; and Rosenstein records a case in which a *tænia* 300 feet in length was discharged from the bowels. Cruveilhier suspects, that some of these calculations have been made, either by adding together the lengths of pieces of different worms, or taking the aggregate lengths of portions of one worm discharged at different periods. The longest in Bremser's possession was twenty-four feet, who however quotes an instance where a *tænia* was found in the dead subject, reaching from the pylorus to within a few inches of the anus, and measuring thirty feet. — Ep.

‡ Cruveilhier, art. ENTOZOAIRE in *Dict. de Méd. et de Chir. Pratiques*.

a worm of this kind from a Russian, that measured three hundred ells !]

The body of the FLUKE is flattish, with an aperture or pore at the head, and generally another beneath; intestines flexuous; ovaries lateral: hermaphrodite, and oviparous.*

Of all intestinal worms, this is one of the most common to animals of different classes. It is sometimes, though rarely, found in man†; but in different species, or under different modifications, we meet with it very frequently and very abundantly in quadrupeds of almost all kinds, reptiles, fishes, and even in worms themselves of a larger growth, for it is occasionally met with in the intestines of the cuttle-fish. Its ordinary seat is in the stomach or alvine channel; but in swine, black-cattle, deer, and sheep, its favourite haunt is the liver, to which it probably creeps forward through the bile-ducts, and where it burrows and breeds in innumerable hosts. This is particularly the case with the *fasciola hepatica*, as it is called by way of emphasis, found so commonly and so abundantly in the liver of sheep that labour under the disease called the rot; though whether it be the cause or the effect of this disease, has not yet been ascertained. Most probably the effect: for the rot is certainly an infectious complaint, and is sometimes caught by a whole flock in a single night. The cause has been supposed to be hydrogenous gas; but of this we have no proof. There can be little doubt, however, that it is produced by some deleterious miasm in the atmosphere originating in the pasture itself, or conveyed there in the form of a haze, in the same manner as vegetable plantations are often blighted, of which I have just offered an example from hop-grounds. Yet by what means the liver of sheep, rather than any other organ, is hereby affected and rendered gangrenous, we have still to inform ourselves. As the animal is oviparous, the minute eggs may be borne by the haze itself, or exist in the stagnant atmosphere of the sheep-ground; or they may already, in the body of the parent-worm, be infesting the alimentary canal, and only waiting for accidental circumstances to exert the full range of their prolific powers; for it is not in the rot alone, but in other cases of visceral diseases, that this animal is traced in sheep, and especially in dropsy, whether connected with the rot or not; and, in both diseases, they are frequently found vomited up in brooks.

As the treatment of all the species should be established on the same principle,—that of invigorating‡ the alimentary canal and surrounding viscera,—and the vermifuges adapted to many of the different tribes, though not to all, are the same,—it will be better to reserve this subject till the nosological characters of the remaining species have passed in review before us.

* C. A. Rudolphi's works, entitled, *Entozoorum sive Vermium Intestinalium Historia Naturalis*, Amst. 1808; and *Entozoorum Synopsis*, Berol. 1819; should be consulted by all who desire the most correct description of intestinal worms. Nor should the writings of Bloch, Goeze, Zeder, Werner, Hermann, Fischer, Brera, Hooper, Lamarck, Dumeril, Cuvier, Blumenbach, Bremser, Laennec, and Cruveilhier (*Dict. de Méd. et de Chir. Pratiques*, art. *Entozoaires*) be forgotten. — ED. † Docver, Verm. p. 54. Clerk, Lumbric. p. 119.

‡ This expression seems to be connected with an hypothesis entertained by some writers, and adopted by Dr. Good, that the production of worms is referrible to a debilitated state of the alimentary canal. — ED.

GEN. XI.
SPEC. I.

ε H. Alvi.
Fasciola.

Found extensively in almost all animals.

Cause or effect of the rot in sheep.

Most probably the latter; and the rot produced by a floating miasm.

Fluke found in other diseases than the rot.

View of the treatment postponed till the remaining species have been noticed.

SPECIES II.

HELMINTHIA PODICIS.

ANAL WORMS.

WORMS, OR THE LARVÆ OF INSECTS, EXISTING AND FINDING A PROPER NIDUS WITHIN THE VERGE OF THE ANUS, EXCITING A TROUBLESOME LOCAL IRRITATION, SOMETIMES ACCOMPANIED WITH TUMOUR; FREQUENTLY PREVENTING SLEEP, AND PRODUCING PAIN OR FAINTNESS IN THE STOMACH.

GEN. XI. UNDER this species are included the following varieties:—
SPEC. II.

| | |
|--------------------------------|---------------|
| α Ascaris vermicularis. | Thread-worm. |
| β ——— Scarabæus. | Maw-worm. |
| γ ——— Cæstrus. | Beetle-grubs. |
| | Bots. |

α H. Podicis.
Ascaris vermicularis.

The head of the THREAD-WORM is subulate, nodose, and divided into three vesicles, in the middle of each of which is an aperture by which it receives nourishment; skin at the sides of the body finely crenate or wrinkled; tail finely tapering and terminating in a point; the female has a small punctiform aperture a little below the head, through which it receives nourishment: gregarious: viviparous; about half an inch long; sometimes wanders into the intestines, and occasionally as high as the stomach.* It was first observed by Morgagni.†

Oxyuris vermicularis of Bremser.

Why called thread-worm.

The sexes of this variety are distinct, but the male organs have not been discovered. This form of intestinal worms was first detected by Hippocrates.‡ Goeze conceives it to be viviparous, but Bremser oviparous.§ It is the *oxyuris vermicularis* of the latter. The animals are of a yellowish white colour, and have a general resemblance to the *ends of threads* cut off, and about half an inch in length, whence the name of THREAD-WORMS, and probably of BOTS, which is often, but erroneously, applied to it, and which I suppose to be a corruption of the French *bouts*, “ends” or “extremities.” The term MAW-WORM, according to Dr. Harvey,

* Bremser doubted whether ascarides vermiculares had ever been found out of the large intestines. Yet Bloch, long before the date of this author’s treatise, had met with them in a cyst formed in the parietes of the stomach; and Brera had seen a considerable number of them in the œsophagus of a woman who died of a slow nervous fever. (*Traité des Maladies Verminenses trad. de l’Italien avec des Notes, Paris, 1804.*) The worms, which have been occasionally detected in the air passages, were the ascarides lumbricoides; but Cruveilhier conceives, that their lodgment in this situation would be incompatible with life, and that their arrival there must have happened after death, or during the final moments of life. In one of these periods, he thinks they passed through the œsophagus into the pharynx, and thence into the glottis. In the example recorded by Andral, the insinuation of such a worm into the larynx of a child produced suffocation.

† Lib. xiv. 42.

‡ Aphor. iii.

§ Ueber Lebende Würmer, 4to. 1819.

is derived from the occasional visit which this animal makes to the maw or stomach in migrating from its proper region, which is the rectum*; but, more probably, from the peculiar effects which it often produces on the maw or stomach by sympathy, and without quitting its home, as a perpetual and gnawing pain and insupportable faintness from the intolerable itching it excites in the anus. Sometimes these worms wander in a different direction, for they have been found in the pudenda: and by Frank in the urethra and the urine.† Very generally, however, they remain quiet and inactive, convoluted in mucus and feces, and are only known to exist by their discharge. Yet occasionally they produce so much irritation as to cause a sensible tumour, or a congeries of small tumours around the anus. They sometimes co-exist with other kinds. Rosenstein gives the case of a child, who, in conjunction with a large number of ascarides, voided ten long worms and a piece of a tænia. The little patient died screaming under the most excruciating pain and convulsions.

The larvæ of the second variety embrace several species of the SCARABÆUS or BEETLE‡, which have not hitherto been accurately described or enumerated; but of which the following seem to be the chief: grey larva, with yellowish legs and ferruginous head, of *s. nobilis*; and those of *s. Schœfferi* and *s. volvens*, which, when out of the body, deposit their eggs in round balls of animal dung, which they roll up and bury with their hind feet. Almost all the grubs of the genus *Scarabæus* delight in, and feed on dung; and hence the eggs find a convenient nidus and the grubs a ready supply of food in the rectum, when accident has conveyed the former into this organ. These grubs have six feet; are annulate, hairy, vesicular at the end of the abdomen, and furnished with a horny head.

The larvæ of the CÆSTRUS, BREEZE, or GAD-FLY, are called bots, and are of a round figure; pale-green; tail obtusely truncate; head tapering; mouth horny, with two lips, and two recurved black claws on each side of the mouth. Found convoluted in the mucus and feces of man, but far more frequently of other animals, and especially of the horse.

The genus *cæstrus* is not numerous, containing in all not more than twelve species. Of these the greater number deposit their eggs on the skin of animals, and are there hatched. The *cæstrus ovis* fixes them on the interior nostrils of the sheep; from which, when hatched, they travel into the frontal sinuses or horns, and, when full fed, are discharged through the nostrils. They excite great irritation, often compelling the sheep to shake their heads violently, and rub or hide their noses in dust or gravel, and sometimes produce inflammation in the brain.

There are only three species, however, whose larvæ seem capable of being hatched in the intestinal canal. These are *cæstrus equi*, *æ. hæmorrhoidalis*, and *æ. veterinus*. The eggs of the last are found deposited on the skin of cattle in general, and those of all on the skin of the horse: the part of the horse preferred by hæmorrhoidal breeze being the lips. The eggs excite a trouble-

GEN. XI.
SPEC. II.
α H. Podi-
cis.
Ascaris ver-
micularis.

Why called
maw-
worm.

Sometimes
travel to the
pudenda.

Sometimes
excite tu-
mours in
the anus.

Sometimes
co-exist
with other
kinds.

β H. Podi-
cis.
Ascaris
Scarabæus.

γ H. Podi-
cis.
Ascaris
Cæstrus.

Eggs
chiefly de-
posited on
the skin of
animals.

How con-
veyed from
hence into
the intes-
tines.

* On Consumptions.

† De Cur. Hom. Morb. Epit. tom. vi. lib. vi.

‡ Paulini Cent. iv. Obs. 8. Timæus, Cas. p. 120.

GEN. XI.

SPEC. II.

γ H. Podi-
cis.

Ascaris

Æstrus.

The variety
found
chiefly in
the intes-
tines of
grooms and
horse-
dealers, and
constitutes
proper bots.

some titillation, which induces the animal to bite the part and lick it with its tongue, in consequence of which the eggs are transferred from the skin to the tongue itself, and find a ready conveyance to the rectum, which is their proper nidus.*

It is the hemorrhoidal breeze, whose eggs are chiefly, if not solely, hatched in the human intestines, and especially those of grooms and other persons, whose duty leads them to associate much with horses, and other large domesticated quadrupeds. And it is the grubs or larvæ of this genus, when discharged from the anus, that constitute the proper *Bots* of veterinary writers, though the term is often misapplied to the *ascaris vermicularis*, as observed already, to which, indeed, they have some resemblance.

Mr. Greenhaw has described a very copious discharge of transparent globular materials from the rectum of a boy of nine years of age, which he thinks were hydatids.† [They were of the size, and many of them of the colour, of gooseberries. The editor was once consulted by a gentleman who occasionally voided from the rectum a yellowish fluid, containing small globular bodies, resembling hydatids, attended with severe irritation about the bladder.]

SPECIES III.

HELMINTHIA ERRATICA.

ERRATIC WORMS.

WORMS, OR THE LARVÆ OF INSECTS, INTRODUCED BY ACCIDENT, AND WITHOUT FINDING A PROPER HABITATION IN THE STOMACH OR INTESTINES; PRODUCING SPASMODIC COLIC WITH SEVERE GRIPINGS; AND OCCASIONALLY VOMITING OR DEJECTION OF BLOOD.

GEN. XI.

SPEC. III.

OF this subdivision we know but little; yet the ensuing instances may afford sufficient reason for forming it. It might easily be enlarged; but the authorities for extending it further are doubtful.

α Gordius.

β Hirudo.

γ Musca.

Hair-worm.

Erratic leech.

Maggots.

α H. er-
ratICA.

THE GORDIUS is the seta equina, or horse-hair-worm, of the old

* Such of the ova of the æstrus as are conveyed into the horse's stomach by deglutition become larvæ, or grubs, which attach themselves by tenacula to the lining of the œsophagus and stomach, and seldom to the interior of the bowels. When they are completely developed, and prepared for another metamorphosis, they are spontaneously loosened, and then voided with the excrement. A horse's stomach, studded with a multitude of these larvæ, not only in its epidermic or splenic portion, where they usually fix themselves, but in its pyloric part, is what every body must have seen. — ED.

† Edinb. Med. and Surg. Journ. No. lxxvii. p. 574.

writers. It is found in soft stagnant waters; from four to six inches long, twisted into various knots and contortions; colour, pale brown, with dark extremities.

This disease is most frequent among the peasants of Lapland, and was suspected by Linnæus, and has been since proved, or thought to be proved, by Dr. Montin, one of his most celebrated disciples, to be occasioned by their drinking the half-putrid water of stagnant marshes or ditches inhabited by the gordius. It is not known on the Lapland mountains. The gripings are often so violent that the patient rolls and writhes on the ground in severer agony than a woman in labour, and discharges bloody urine. After many hours, sometimes an entire day, the disorder terminates in a profuse ptyalism, that continues for a quarter of an hour. The Laplanders call the disease *Ullen*, or *Hotme*.*

The SECOND VARIETY includes several species of the LEECH, swallowed, when minute and young, along with the muddy and stagnant water they inhabit.

Apparently both the medicinal and the horse-leech (*h. sanguisuga*) have been thus found; but the exact species has not been sufficiently indicated. Sauvages, in his genus *Hæmatemesis*, quotes Galen, Schenck, and Wedel, but does not describe the species. Upon turning to Galen, iv. 411. D. the reader will find that he briefly adverts to the disease, and quotes from Asclepiades and Apollonius the remedies that were employed in their respective days; but he does not characterize the worm.

Of helminthia, from this cause, we have numerous examples in foreign writers and journals†; but we need not travel from our own country for instances. Of domestic examples, several are related in the comment to the volume of Nosology; and, though apparently well attested, are of a truly marvellous character. The fact appears to be, that, from fixing on the internal tunic of the stomach, or intestines, these worms riot on so rich and plentiful a repast, that they grow to an enormous size, and evince such a deviation from their common shape, as in some instances to be recognized with great difficulty. It is highly probable, however, that they can only live in dyspeptic patients, or persons whose digestive powers are infirm: for there are few or no animals capable of resisting the solvent power of the gastric juice when secreted in full health and vigour.

One of the most extraordinary instances among those entitled to attention is related by Mr. Paisley in the Edinburgh Medical Essays.‡ In this case, there were two worms, whose heads the author compares to that of the horse-leech, and which appear to have been tolerably quiescent in their growth, till the general system was disturbed by a wound on the breast received by the patient in consequence of a duel with the small sword. The general symptoms of this species of helminthia appeared about the third day afterwards, and continued with many variations for several weeks, when the patient discharged inferiorly one of these worms, measuring a foot and a half in length, and an inch and a

GEN. XI.
SPEC. III.
α H. er-
ratica.
Gordius.

β H. er-
ratica.
Hirudo.

Wonderful-
ly changed
from their
common
forms when
in the in-
testines.

* Linn. Flor. Lap. de Angelica. Montin, Amœn. Acad. Splachnum, ii. 26.

† Eph. Nat. Cur. Cent. vii. Obs. 25. — Rhodius, Cent. ii. Obs. 72. — Blanchard, Collect. Med. Phys. Cent. i.

‡ Vol. ii. art. xxvi.

GEN. XI.
SPEC. III.
♂ H. er-
ratica.
Hirudo.

half in diameter, dead, but full of blood, and accompanied by a large dejection of grumous blood, "to appearance some pounds;" and not many weeks afterwards, the other still larger. A worm, apparently similar, is stated by Dr. Bond of Philadelphia, in 1754, to have been discharged downwards, by a female patient of his, who had been long subject to an hepatic disease, which gradually changed to violent helminthic symptoms in the stomach. These at length suddenly vanished, and within twenty-four hours the worm was dejected, dead, and in two parts, the whole making twenty inches in length. The patient died soon after; and on opening her, this worm appears to have worked its way, when small, into the liver, by the course of the common duct, to have committed great depredation here, and afterwards, with considerable difficulty and dilation of the duct, to have travelled back again. Dr. Bond ventures to call it an *hepatic leech*; though he calculates its course as now stated.*

[In Egypt, the French soldiers, urged by severe thirst, frequently drank the muddy water of lakes and pools; an opportunity was thus given for the insinuation of leeches into their nostrils, and even into their stomach. The same annoyance likewise befell the soldiers of the same nation at Port Mahon, in 1757. In one of the latter cases, the patient, after having vomited up three pints of blood, requested of his own accord the proper remedy, namely, some vinegar; and as soon as this had been taken, the leeches were rejected. According to Larrey, the removal of these animals from the nostrils, when they cannot be laid hold of with forceps, is most effectually accomplished by means of a lotion, composed of nitre and diluted vinegar.† The long continuance of the leeches generally produced much indisposition, a loss of flesh, and sometimes delirium.]

γ H. er-
ratica.
Musca.

Eggs,
where de-
posited.

Hoppers.

How reach
the animal
intestines.

Examples.

The THIRD VARIETY consists of the grubs of different species of that subdivision of the genus MUSCA, or FLY, whose sucker is possessed of a single bristle without a sheath, and short; clavate, furnished with a lateral hair. These deposit their eggs in game and other meats that have been long kept, and are approaching a putrid state, as *musca carnaria*, or flesh-fly; *m. vomitoria*, or blow-fly; *m. cibaria*, or pantry-fly; or perforate and lay their eggs in cheese, bacon, hams, or other salted and high-tasted viands, as *m. putris*, the larvæ of which are known to the housewife by the name of *hoppers*, as those of all of them are by that of *maggots*; which last has often, though in a looser sense, been applied to the grubs of insects generally.

From the deposit of the eggs of these species of the fly in so many branches of the common food of man, there is no difficulty in conceiving how they may pass into the human intestines. In a sound state of the stomach, indeed, we have little reason to believe, that they could be hatched and live in that organ; but they may find a convenient nidus, and live comfortably in a debilitated stomach, and apparently through the entire range of the intestinal canal.

The cases of this affection are numerous. One of the best re-

* London Med. Observ. and Inq. i. 68.

† Mem. de Chirurgie Militaire, tom. i. p. 362.

lated is that of Dr. White. The patient, aged thirty, was emaciated, of a sallow complexion; had gripings and tenderness of the abdomen; costiveness, rigors, and cold extremities. Took columbo root, and occasionally calomel and other purgatives. In a month was better, and the appetite good. The next purgative brought away an immense number of pupes or chrysalid worms; some of which being preserved, were transformed into the *musca cibaria*.

We have also examples of the larvæ of other insects that have entered the stomach by some accident or another. Thus, Mr. Church, to whose entomological skill Dr. White confided the examination of the above paper, asserts, that he once knew a child discharge a larva of the caddy insect (*phryganea grandis*); and that the *phalena pinguinalis* lives and is nourished in the stomach; and, after sustaining several metamorphoses, is thrown out, and proves its proper genus.* Mr. Calderwood has published a like case†; Riedlin, examples of other fly-maggots‡; other writers, of the larvæ of the beetle, or the bee discharged by the anus after violent gripings§; while Planchon describes a live spider thrown forth from the same opening.||

Weikard gives an instance of a *triton palustris* discharged by vomiting¶; and many of the continental writers have examples of rejection by the same passage of the *lacerta aquatica*, unquestionably swallowed when minute and unperceived, with the water obtained from ponds and lakes.** In one instance not fewer than five of these were thrown back at a time.††

But of all such marvels, the most extraordinary, and one of the best attested, is that narrated by Dr. Pickells‡‡; consisting of enormous progenies of apterous, dipterous, and coleopterous insects, discharged both by the mouth and anus. The patient was a young woman, who had long been in a melancholy frame of mind from the loss of a beloved mother, and who, under a superstitious idea, that a certain portion of clay drunk daily, from the graves of pious clergymen, would preserve her from disease as well as from sin, contrived to stock her chamber with a large quantity of this material from the graves of two clergymen whom she had known, and which appears to have formed a bed for the eggs of the insects thus hatched in the stomach. "Of the larvæ of the beetle," says Dr. Pickells, "I am sure I considerably under-rate when I say that, independently of above a hundred evacuated per anum, not less than seven hundred have been thrown up from the stomach at different times since the commencement of my attendance. A great proportion were destroyed from an anxiety to evade publicity; many, too, escaped immediately after having been vomited, by extricating themselves quickly from the vessel, and running into holes

GEN. XI.
SPEC. III.
γ H. er-
ratica.
Musca.

Bee lodged
in the in-
testines.

Spider.

Triton
palustris.
Lacerta
aquatica.

Singular
example of
a general
repository
in the
stomach of
insects and
other
parasites.

* Mem. of Med. Soc. of London, vol. ii. † Edin. Med. Com. ix. 223.

‡ Cent. iii. Obs. 85.

§ Obs. Med. Cur. de excretionem vermis nunquam ante excret. Wolffenh. 1723.

|| Journ. de Méd. iv. p. 203.

¶ Vermischte Schriften, iv. p. 127. Kl. Schrift, p. 82.

** Journ. de Médecine, tom. ix. p. 447. — Schwarz, Med. Wockenblatt. 1780. No. 27.

†† Observ. Méd. Cur. de excretionem vermis, etc. ut supra. Wolffenh. 1723.

‡‡ Trans. of the Association of the Fellows and Licentiates of the King and Queen's College of Physicians in Ireland, vol. iv. art. vii. 8vo. 1824.

GEN. XI.
SPEC. III.
γ H. er-
ratica.
Musca.

in the floor. Upwards of ninety were submitted to Dr. Thompson's examination, nearly all of which, including two of the specimens of *tenebrio molitor* (*darkling*), I saw myself, thrown up at different times. The average size was about an inch and a half in length, and four lines and a half in girth. The larvæ of the dipterous insect, though voided only about seven or eight times, according to her account, came up almost literally in myriads. They were alive and moving." [In an interesting appendix* to the preceding account, Dr. Pickells states, that under a persevering use of common turpentine, in doses, gradually increased to the enormous one of six ounces, the larvæ of the beetle, which were the principal source of annoyance, had been destroyed, and that the patient now enjoys almost total immunity from her long protracted and complicated diseases. In the course of a year and a half, subsequent to his former communication, she had voided more than 1300 additional beetle larvæ, principally from the anus, making in the whole nearly 2000 seen by Dr. Pickells, besides many others which he did not see. Besides the beetle larvæ, dipterous ones continued to be voided at intervals during the same period, both from the stomach and the rectum; sometimes without medicine, but more frequently by the effect of castor oil, strong doses of turpentine not killing them. Ascarides, resembling the ascarides felis, were also discharged upwards and downwards, as well as numerous larvæ of blaps. Whence the constant supply of the latter was derived, is a very puzzling question in the history of this extraordinary case; for, if they propagate only in the imago, or perfect state, as is asserted, their generation within the body can hardly be supposed, as only two insects far advanced, one an imago, the other a pupa, were known to be discharged, and yet larvæ of every gradation continued to be voided to the last. Her food and drink were from the same source as those taken by other healthy persons; and she lived on an upper floor where the kind of beetles, which she voided, are not usually found.]

Many of the larvæ or insects thus thrown up, had been preserved alive in clay or pill-boxes, for upwards of a twelvemonth at the time of writing. Pain in the stomach, suppression of the menses, irritation of the bladder, hæmatemesis, occasional perversion of all the external senses, vertigo, convulsions, catalepsy, mania, delirium, and various other affections of the nervous system, indicative of helminthic irritation, were the sad train of evils that alternately overpowered the patient. [The quantity of blood thrown up from the stomach, in the course of the case, was such as to create surprise that she should have been able to bear the loss. A retention of urine, with which she was long afflicted, was completely removed after a dose of five ounces of turpentine, a great deal of blood at first coming away with the urine. The same medicine also evinced great power in restoring the catamenia.]

To all these parasitic vermicles will apply the remark I have already made upon a single variety; that they appear, from the luxuriance of their haunts and repasts, to be in various instances peculiarly enlarged, and altered from the structure they exhibit out

From their altered forms, great difficulty in determining their exact species.

* Op. cit. vol. v. p. 171, &c. 8vo. 1828.

of the body*: whence the great difficulty of determining in many cases the exact external species to which a larva, worm, or animal-cula found within the animal body may belong. Yet of all the erratic worms and grubs, the horse-leech, *hirudo sanguisuga*, appears to undergo the greatest metamorphosis; and, as observed in the comment to the Nosology, is reported in one instance to have reached the size of a man's fist, and to have contained a pound and a half of blood.

GEN. XI.
SPEC. III.
γ H. erratica.
Musca.
In the leech and horse-leech especially.

GENERAL DIAGNOSIS AND TREATMENT.

We have had occasion to observe, that the stomach is the great organ of sympathy, and associates in affections of the most remote parts of the system. It follows necessarily, that other parts of the system must, in various instances, associate in affections of the stomach. This is particularly the case with respect to the irritation produced by worms, and especially those that exist in the stomach itself, or the upper part of the alvine canal, as lying nearest to it.

Diagnosis.

"The evils† which hence arise," says Dr. Heberden, who has well drawn up the general train of symptoms, "and which cease on their expulsion, are head-aches, vertigo, torpor, disturbed dreams, sleep broken off by fright, and screaming, convulsions, feverishness, thirst, pallid hue, bad taste in the mouth, offensive breath, cough, difficult breathing, itching of the nostrils, pains in the stomach, nausea, squeamishness, voracity, leanness, tenesmus, itching at the anus towards night, at length dejection of films and mucus. The broad tape-worms produce the severest mischiefs on the body; the teretes and ascarides (round and thread-worms) sometimes lurk scarcely suspected, unless there is itching of the anus, or they are traced in the feces. I have seen a broad tape-worm expelled from the intestines four ells in length. The long tape-worm (*lumbricus cucurbitinus*) seems to be a series of many worms, a single joint of which will sometimes live when separated from the rest. The round worms have ascended into the mouth, and have even lived two or three days after they have been discharged. In two patients, under my care, there was room for suspecting, that the gourd-worm had induced epileptic fits, mania, and idiotism."

As described by Heberden.

Upon this passage it is only necessary to observe, that the long tape-worm, *tænia solium*, or, as Dr. Heberden calls it, *lumbricus cucurbitinus*, is not a series of many worms, as this elegant writer suspected, and as, indeed, is generally suspected at present; and although its different joints, when separated from the rest, are capable of maintaining for a short time an independent life, they neither continue alive long, nor are competent to produce any increase. They have, however, been sometimes found alive at the time of expulsion.

Remarks on Heberden's description.

There are other mischievous effects than Dr. Heberden has here pointed out occasionally to be traced in remote organs, from the sympathetic action of worms lodged in the intestines. Thus the

Other mischievous effects.

* Bremser, Ueber lebende Würmer in lebenden Menschen.

† Mala, quæ ex his oriuntur, quæque his expulsi finiuntur, sunt dolores capitis, vertigo, torpor, somnia, &c. Cap. lix. p. 243.

GEN. XI.
SPEC. III.
Helmin-
thia.

lungs, as well as the brain, have frequently been found to participate in the disease, and at times the uterus; and a profuse hemorrhage has ensued from the one or the other organ, and very frequently from the nostrils, and been repeated at uncertain intervals, in some instances without any suspicion of the real cause, and consequently with an erroneous practice. Mr. Rumsey, of Beaconsfield, has published an instructive paper upon this subject*, in which various cases of sympathetic hemorrhage and pulmonary affection seem to have been relieved by an anthelmintic course.

Worms to
be suspect-
ed in ob-
scure cases.

"In all obscure diseases," says Dr. Swediaur, "attended with symptoms that are chiefly anomalous, the suspicion of the physician should be directed to intestinal worms. I once knew a case in which the patient, who was miserably afflicted with pains in various joints of the body, simulating those of arthrodynia, by taking an anthelmintic, and discharging in consequence hereof, various fragments of a *tænia* with a mass of mucus, became perfectly well. So," continues he, "have I known apoplexy and palsy removed by a discharge of worms from the intestines: and had once a patient remarkable for a filthy and fungous excrescence on the nose; who lost the excrescence spontaneously after a successful course of vermifuges."†

Sometimes
fatal.

[Intestinal worms are sometimes so numerous, that they occasion death. This is not uncommon in children from the effect of lumbrici‡; and happens even to adults whose bowels contain *tæniæ* of extraordinary size.]

Weakly
habits
found most
usually a
nidus;

There is yet great space for improvement in the mode of treating this complaint. The larger worms unquestionably are found most frequently in young persons, or persons of weakly and inelastic fibres, and dysthetic habits; and hence our first intention should be to invigorate the system generally, and the stomach and intestines particularly, by bitter and other tonic medicines: for it is not often that they resist a very strong living action. And yet I have sometimes found the long round worm in persons, who have made no complaint of ill health, of regular habits, and in the middle of life. § Worms have occasionally infested the alvine channel for years without any serious evil—the ascarides, indeed, as Dr. Heberden informs us, for thirty years, or for even the whole of a long life, without any reason to suspect, that they had hastened its end||; whence some writers have been fanciful enough to conceive, that, in animals of most genera, they form a mean of maintaining the general health, and are a regular part of the economy of perfect life. [Dr. Rush conceived, that they might sometimes promote health, by diminishing the quantity of redundant mucus in the intestinal canal.] "Worms," says Dr.

but not
always.

Sometimes
they infest
through the
whole term
of life.
By some
erroneously
supposed to
contribute
to health.

* Transact. of the Medico-Chir. Soc. vol. ix.

† Nov. Nosol. Meth. Syst. vol. ii. p. 245. Cruveilhier takes a very different view of this subject from that adopted by Heberden, Swediaur, and others; for he has no faith in the doctrine, which sets down intestinal worms as the cause of a multitude of obscure diseases.

‡ See two cases in Corvisart's Journ. de Méd. tom. xii. p. 3.

§ Dr. Elliotson has seen many individuals, who, to their great astonishment, discharged several feet of tape-worm, not having the least idea, previously, that any thing was the matter with them. Lectures in Med. Gazette for 1832-33, p. 693.

|| Transact. of the College of Phys. of London, vol. i. p. 54.

Parr, "seem to form part of a healthy constitution, and are scarcely injurious but from accidental circumstances."* This quaint though common paradox, however, is somewhat shaken by the doctrine contained in the next paragraph; in which a very unnecessary and untenable distinction is drawn between the law which in this respect regulates animals and vegetables; and followed up by a remark at variance not only with general observation, but with the import of Dr. Parr's own reasoning upon the subject. "This circumstance," says Dr. Parr, "forms a striking distinction between animals and plants. Parasitic animals attack only debilitated plants: but the healthiest animals are chiefly affected with worms; and the observations which seem to contradict this, arise from a neglect of the distinction between the existence of worms and their *appearing* a source of disease from their *accumulation*. Their formation is assisted by accumulations of mucus; and, consequently, in children, sometimes in cachectic patients, they become *inconvenient*."

Inconvenient is a somewhat gentle term for expressing the fearful host of effects which we have just enumerated from Dr. Heberden, and which Dr. Parr himself has in other places arrayed in form and number quite as appalling. But if this *inconvenience* be mostly promoted by an accumulation of mucus, and if children and cachectic patients be mostly exposed to such accumulation; these worms do not seem, properly speaking, to form part of a healthy, but rather of a weakly constitution; nor can the healthiest be said to be chiefly affected by worms. And the same general law applies equally to animal and vegetable life. In both, the most imbecile are the most affected; and the strongest, when affected, are the least injured, for the very reason that they are the strongest.

The disease called *rot*, in sheep, to which I have already alluded, is a further illustration of this remark. Here the fasciola, or fluke,

GEN. XI.
SPEC. III.
Helmin-
thia.
Such the
opinion of
Dr. Parr.

But at va-
riance with
other opi-
nions of his
expressed
elsewhere.

Parasites
found
chiefly in
weakly
plants as
well as ani-
mals.

Illustrated
from the
existence of
flukes in
sheep la-
bouring
under the
rot.

* Worms have even been conjectured to do good by stimulating the digestive organs, and promoting all the functions. The latter idea was that of Goeze, who, in his admiration of the universe, and especially of man, the chef-d'œuvre of the creation, endeavours to prove, that all things have been created for man, because all of them are either directly or indirectly useful to him, as, for instance, even intestinal worms. But, as Cruveilhier observes, though it has often happened, that numerous worms have remained in the alimentary canal without producing inconvenience, or even causing any symptom indicating their presence, it has much more frequently been the case, that complaints of greater or lesser severity have ceased directly after the expulsion of a considerable number of worms. But here, he thinks, a distinction is to be made between what is truly owing to the expulsion of the worm, and the good done by the vermifuge medicines on some other principle; for many cases are related in which epilepsy, chorea, convulsions, colic, hysteria, and a variety of other diseases, yielded to vermifuge medicines, though no worms were expelled by them. But Cruveilhier conceives, that some doubt will always continue respecting what complaints truly depend on worms, inasmuch as the symptoms caused by them cannot be discriminated from such as arise from concomitant causes. He does not admit that there are any *worm diseases* (properly so called), that is to say, diseases which depend entirely on the presence of worms in the intestinal canal. He acknowledges that there are symptoms of worms, though there is nothing very characteristic in them, all being more or less vague. The certainty of the existence of worms can only be acquired by their expulsion; but, it is one thing to determine their presence, and another to ascertain what influence they have in diseases. (Dict. de Méd. et de Chir. Pratiques, art. Entozoaires.)—ED.

GEN. XI.
SPEC. III.
Helmin-
thia.

And their
mode of
cure.

Treatment.
Hence the
system to
be strength-
ened gener-
ally: and
then an-
thelmintics.

Or both
used simul-
taneously.

Worms de-
stroyed
with diffi-
culty in the
body, and
why.

Vermifuges
apt to
weaken the
action of
the stom-
ach.

Aperients
necessary
at first, and
why.

Afterwards
anthelmin-
tics.

The list of
these very
numerous.

Divided
into two
classes.

First class
operating
by chemical
or external
action.

makes its appearance in prodigious numbers in the liver of the animal, which is sometimes entirely preyed upon and destroyed. Though there is some doubt among physiologists whether this worm be the cause or the effect of the disease, all are agreed, that the malady never appears in a wholesome atmosphere, and a strong and vigorous state of health: and it has of late been sufficiently ascertained, that tonic stimulants, and especially the stimulant property of sea-salt, whether mixed with the food mechanically or chemically, as in salt marshes, is the best and most effectual mode of cure. The food of merinos, in Spain, is therefore constantly enriched with salt; and Lord Somerville justly attributes the health of his flock, of upwards of two hundred merinos, which he purchased in Spain, to the use, which he has for years made of this article on his farm. A ton of salt is the proportion employed annually for every hundred sheep.

One mean, therefore, and perhaps the most powerful in our possession, of getting rid of intestinal worms, is that of strengthening the system generally, and the alvine canal particularly. Our next mean is the use of what have been called anthelmintic medicines, or those which either destroy worms, or drive them from the body by qualities which torment or distress them. Both these intentions may sometimes be pursued simultaneously; and where they cannot, from the weakness of the patient, we should commence with the former. A decisive vermifuge process is yet a desideratum: for, first, worms lie for the most part so low in the intestines, or are so completely involved in viscid mucus or other slime, that oil of turpentine, tobacco-water, and mercurials, which readily enough destroy them out of the body, seldom go directly home to them when within it; and next, most of the medicines, that promise to produce this effect, have a tendency at the same time to weaken the action of the stomach and intestines, and consequently to render them a fitter habitation for such unwelcome tenants.

Worms, by their irritation, augment the secretion of mucus, in which also they involve themselves. Brera says they feed upon it, and if deprived of it they die.* By keeping the bowels loose, we prevent the accumulation of this slimy material in which the worms burrow: and if we have reason to believe, that such accumulation has taken place, the best plan is to give active purges, as calomel, jalap, scammony, gamboge, or an intermixture of these, for its removal: and having thus, as far as we are able, exposed the naked bodies of the worms to the action of ANTHELMINTICS, we should proceed with the latter without loss of time.

The list of these is almost innumerable; and the very length of the catalogue serves to show us how little we can place a positive dependence, even at the present hour, upon any one of them as a specific.

Anthelmintics may be conveniently divided into two classes. Firstly, those that dislodge and drive away intestinal worms by some mechanical or other external action; and, secondly, those that destroy them by some narcotic or other internal means.

In the former we may rank all the drastic cathartics; all the

* Lezioni sui Principali Vermi del Corpo umano, 4to. Crema, 1801.

oleaginous vermifuges, as oil of olives, beech-nuts, castor, and turpentine; sulphur, petroleum, and sea-salt; tin-filings; crude quicksilver, or Plenck's grey mucilage of it; the lunar pill of Boerhaave, formed from a preparation of silver, which may be regarded as a mild lunar caustic; and the bristly down of the pods of cowhage. In the latter we may place the male-fern, hellebore, fetid hellebore, cevadilla, tansy, savine, rue, dittany, tobacco, wormseed (*artemisia santonica*, Linn.), bark of the bulge-water tree (*Geoffroya inermis*), and of the cabbage tree (*areca oleracea*); the *spigelia*, and *scabiosa Indica*.

Simple purgatives, even the most active and drastic, seem to have little other effect than that of clearing away the mucous and other viscid materials, in which most of the intestinal worms are fond of burrowing, and thus exposing their naked and tender bodies to the action of other and more direct anthelmintics. Even colocynth, which unites a bitter principle to a cathartic power, and which on this account was for ages regarded as an anthelmintic doubly armed for the field, is now well known to be incapable of poisoning them—as Redi has exposed various kinds of them to a strong decoction of this medicine for four-and-twenty hours without serious mischief.

It is, nevertheless, obvious that these medicines have their use, and are in fact of very great importance; and especially in the case of children, whose bowels are more easily loaded with mucus than those of adults, and who, on this account, bear active purgatives with much less inconvenience. In an attack upon worms, brisk cathartics should always take the lead. They ought not, however, to be too frequently repeated, nor continued through a long series; as in this case, they will rather augment, than diminish, the mucus by their own irritation.

Upon the oleaginous vermifuges we can place but little dependence, if we except the terebinthines. Olive and castor oil may be of slight subsidiary benefit, by mixing with the surrounding slime, and removing it by what purgative power they possess; but their chief benefit, if they be serviceable at all, is probably in greasing the bodies of the worms, and blocking up their stigmata or respiratory pores*: in which view, they are better adapted for the cure of worms that infest the stomach and upper intestines, where they can exert their power at once, and without dilution or chemical change, than for those that take up their habitation lower; and especially for the cure of the long round and the long thread-worms, as these are killed more readily than the tape-worms, which often only perish by separate joints. For the cure of vermicular *ascarides* †, or maw-worms and bots, these oils have been

GEN. XI.
SPEC. III.
Helmin-
thia.

Second
class oper-
ating by a
narcotic or
other inter-
nal power.

Purgative
anthelmin-
tics.

How far
useful.

Oleaginous
anthelmin-
tics.

How far
useful;

and against
what worms
chiefly.

* This remark does not agree with the conclusion at which Cruveilhier arrives, who reminds us that fixed oils were proved, by the experiments of Arne-mann and Redi, to have no specific power against worms, and that castor oil is efficacious only as a purgative. Human *ascarides*, immersed in it, lived not less than from forty-four to forty-eight hours. Cold, alcohol, and empyreu-matic oils destroy worms instantly. In several instances where worms occupied the great intestines, Cruveilhier found cold clysters successful. (Dict. de Med. et de Chir. Pratiques. t. vii. p. 352.)

† Of all the kinds of intestinal worms, the *ascarides vermiculares*, or oxyures, are the most easy to detect, for their favourite residence is in the folds or the lower part of the rectum, where they produce violent itching, and sometimes excessive

GEN. XI.
SPEC. III.
Helmin-
thia.

used in the form of injections : but we have no decided proofs of any great benefit that has been derived from their use in either way, in respect to the worms, for which, indeed, they are rarely to be recommended, though they are often useful in taking off the irritation of the mucous membrane itself.

Terebinthi-
nate oils.

The terebinthinate oils are far better entitled to our attention, and appear to act as purgatives upon the bowels, and as external irritants upon the worms exposed to them. The vermicular ascaris rarely resists their use when given in a dose sufficiently large to reach the rectum, or when injected into this organ ; and has been discharged in great abundance.* The alvine worms, if not equally

How far
serviceable.

affected, are nearly so ; even the tæniae have yielded to their acrimony.† The rectified oil of turpentine is that in common employment. [Convincing proofs of its efficacy in cases of tænia were published by Dr. Fenwick‡, of Durham, to whom the merit of its first administration has been erroneously referred, not only by the author of this work, but other distinguished men.§ Turpentine was recommended for its anthelmintic virtues even by Bartholine|| ; and Chabert's celebrated remedy consisted principally of it.¶] Turpentine is usually given in doses of from half a drachm to a tea-spoonful to an infant, and from an ounce to an ounce and a half to adults, alone, or with a little peppermint or cinnamon water ; though for infants the best medium is milk. These doses, however, may be considerably increased, and will in many obstinate cases be found insufficient. [In the extraor-

By whom
first em-
ployed.

In what
proportions
given.

pain. When there is reason to suspect them, the lower end of the bowel should always be examined. In several cases mentioned by Cruveilhier, complete relief was afforded by keeping mercurial ointment applied to the anus for a few days. This author has remarked, that ascarides vermiculares very commonly cause inconvenience chiefly in the night-time, after the young patients have been put to bed. He considers it probable, that they only cause uneasiness when situated near the lower end of the rectum ; and in this manner he endeavours to account for cases on record, where patients had no ailments, though they passed a vast number of vermicular ascarides (Dict. de Méd. et de Chir. Pratiques, art. Entozoaires). Sometimes these animals get into the vagina, and occasion intolerable itching, and even, as is alleged, nymphomania. In one instance, related by Beck, the injection of a bitter decoction into the vagina brought away a large number of oxyures, and gave prompt relief. A solution of the sulphate of iron is also known to destroy ascarides very promptly.

* For destroying worms, "one of the best remedies is unquestionably oil of turpentine. In the case of ascarides, which are easily known from their crawling out, from their appearing in the stools, and from the extreme itching which they cause in the rectum, it is best to give the oil of turpentine by injection. You thus send it immediately on the part where the worms reside ; you save the patient the trouble of a filthy dose, and you save the stomach from great disturbance. From a drachm to half an ounce may be given to a child, mixed with gruel, and it will often bring away thousands. Adults will take an ounce or more in an injection," &c. — Elliotson's Lect. in Med. Gazette, 1832-33, p. 692.

† Diseases of Tropical Countries. By C. Chisholm, M. D. p. 99. Lond. 8vo. 1822.

‡ Med. Chir. Trans. vol. ii.

§ See Gregory's Elem. of Physic, p. 521. 2d edit. In 1792, Mr. Madden, a surgeon at Putney, seems to have mentioned oil of turpentine as a good medicine for worms (Trans. of Lond. Med. Soc.), but he was anticipated by others, as explained in the text. — ED.

|| Epist. iv. p. 345.

¶ Journ. Encyclop. 1781.

dinary case, already quoted, Dr. Pickells gradually increased the dose of common turpentine to six ounces.*] A child of ten or eleven years old may take an ounce without any evil effect in ordinary cases: but, in delicate habits, a full dose sits uneasy on the stomach, and disquiets the system generally, though in different ways; for it sometimes produces a general chill and paleness, sometimes a tendency to sleep, and sometimes an alarming intoxication. It is in small doses alone, as half a drachm or a drachm to an adult, that it enters into the circulation, and proves an acrid irritant to the bladder, often exciting bloody urine.†

The subject requires further attention than it has hitherto received; for it is probable, that some of the terebinthinate essential oils, while equally deleterious to worms, are less disposed to disagree with the stomach and affect the system, as the Hungarian balsam, or distilled oil of that variety of the *pinus silvestris* which has been called MUGHOS; or the distilled oil of the green cones of the same tree, formerly called *oleum templinum*; and at one time sold at a high price, and as a great secret, by German itinerants under the name of KRUMMHOLZÖHL.

[In 1823, Dr. Kennedy proposed the exhibition of the oil of croton for completing the expulsion of intestinal worms, after their destruction by oil of turpentine, or other anthelmintic medicines.‡ In Italy, the oil of croton has been tried by Puccinotte§ as a means of destroying tæniæ, as well as procuring their prompt discharge. One drop of the medicine was exhibited in beef-tea, at intervals of two or three days; the first dose expelled many fragments of the worm; and a little perseverance in the plan soon effected a perfect cure.]

The petroleum, pisselæum, and animal oil from horns, all of them highly esteemed as vermifuges in former times, possess like virtues, but in a subordinate degree, and are more unmanageable in preparing them for the stomach. Chabert, Goeze, and Professor Bremser ||, of Vienna, who has cultivated this subject more attentively, perhaps, than any other pathologist in Europe, unite some one of these empyreumatic oils with the oil of turpentine, giving a third part of the former with two thirds of the latter: one or two tea-spoonfuls of this mixture being the ordinary dose at night and noon.

[According to Dr. Larini ¶, the plant called samphire (*Crithmum maritimum*) is a powerful vermifuge, especially in cases of lumbrici; a virtue that seems to depend upon its containing an oil very similar to petroleum.]

The sulphureous and Harrowgate waters and those of Barèges, appear to act in like manner; they are double irritants, and pro-

GEN. XI.
SPEC. III.
Helmin-
thia.

Empyreu-
matic oils.

Samphire.

Sulphu-
reous pre-
parations.

* See Trans. of Assoc. Physicians, &c. Ireland, vol. v.

† Dr. Elliotson recommends it not to be given to the patient when he is fasting, lest it create sickness. When it does not operate well downwards, he gives castor oil, and repeats it every two hours, till the turpentine has found its way out. In this manner, he prevents the dangerous consequences which turpentine has sometimes produced. Lect. Med. Gazette, 1832-33, p. 694.

— EDITOR.

‡ Lond. Med. Repository, Feb. 1823.

§ Annali Universali di Medicina, Aprile e Maggio, 1825.

|| Ueber lebende Würmer in lebenden Menschen, 4to. Wien. 1819.

¶ Mem. of the Acad. of Turin, vol. xxv.

GEN. XI.
SPEC. III.
Helmin-
thia.

Sea-water
and other
solutions of
muriate of
soda.

Their use
illustrated.

Taken in
very large
quantity.

Crude
quicksilver.
Lunar pill.

bably goad the worms while they stimulate the bowels. [Whether pure sulphur, uncombined with oxygen, or the alkalies, has a vermifuge power, is doubted.*] But the efficacy of all these is far less, than that of the essential oil of turpentine.

Concentrated sea-water, or a briny solution of sea-salt in spring-water, has been recommended from very high authorities, and has been found in many instances highly advantageous. It acts upon the same double principle as the preceding, though probably with more energy. The acrimony of sea-salt is troublesome to every variety of intestinal worms. I have already observed, that it is the best prophylactic against the attack of flukes in sheep, while it gives, at the same time, a healthy stimulus to the visceral organs; and where leeches, or indeed any of the erratic division of worms or larvæ are suspected, we are nearly certain of its proving a ready cure from its effects on the same animals out of the body. In the case of maw-worms, it is better to throw up the brine in the form of an injection; but where these are found to be migrating up to the stomach, it should be taken by the mouth. There is a striking example of the benefit of this treatment published by Mr. Leigh Thomas, of Hawarden, Flintshire. The patient is stated to have been reduced to a very high degree of danger, and to have suffered from the disease, almost without intermission, for five years, perpetually wishing for death to put an end to his tortures. He was cured by the accidental recommendation of this remedy of salt and water, which was stated to have wrought wonders in a similar case. He accordingly swallowed two pounds the next morning, dissolved in two quarts of spring water: he was vomited and purged violently, but discharged, by both apertures, a prodigious quantity of ascarides involved in mucus. He suffered, at the same time, much from the common effects of so large a portion of sea-salt, and particularly from strangury; but finding, that he had now obtained an engine with which to move the invading host, he repeated the same dose a few days afterwards, and with the same effects, both good and bad. In a few days, however, he lost every painful symptom, and gradually recovered perfect health.†

On what the anthelmintic virtue of tin-flings depends is somewhat doubtful: nor can they be regarded as an efficient medicine. Yet Dr. Alston was much attached to them, and especially as a cure for the tænia, and gave them in doses of from two drachms to an ounce, in treacle. He ascribed their benefit to a slight combination with arsenic; but it is now fully ascertained, that the metal is at least as successful in its purest state; and its effects are generally supposed to be altogether mechanical. This is certainly the case with crude quicksilver, though not with the grey mucilage of mercury, or the lunar pill, which probably stimulate the tender skin of intestinal worms, and especially those that are fond of burrowing in the mildest mucus, to some spastic and painful retraction. The last was a favourite vermifuge with Boerhaave; and Baldinger was as fond of the first, and asserts that it is peculiarly efficacious in expelling the long thread worm.

* See Dict. des Sciences Méd. l. 57. p. 201.

† Med. Trans. of the College, vol. i. art. iv. p. 54.

Perhaps the most powerful and successful of the irritants that act by an external power, is the prickly and pungent down of the pods of the cowhage (*dolichos pruriens* Linn.), which has long been held in deserved estimation. This plant is a native of India, One of the first accounts, if not the earliest, published of it in this country, is that of Mr. Kerr, at that time a resident at Patna. It was addressed to the Professors of Medicine at Edinburgh, and was given to the world in the Medical Commentaries.* Its powers as an anthelmintic were at the same time detailed by Mr. Cochran, whose character of it was soon afterwards fully confirmed by Dr. Bancroft, from long personal observation in South America.† After stating the frequency of worms of all kinds in that quarter, and endeavouring to account for it, he adds, that from whatever cause these worms originate, their number is so great, and their power so prolific, that the usual remedies are insufficient for their destruction; for which reason the planters in general have been induced to employ cowhage. "Who first suggested it," says Dr. Bancroft, "I know not, but its efficacy is indisputable. The part used is the setaceous hairy substance growing at the outside of the pod, which is scraped off, and mixed with common syrup, or molasses, into an electuary: the dose, a tea-spoonful to a child, and double to an adult, in the morning, fasting, and repeated the two succeeding mornings, after which a dose of rhubarb is usually subjoined." The planters in this manner commonly give it once in three or four months to their slaves in general, and especially to the children of their slaves; and the author tells us, that he has known it thus administered to hundreds, from one year old and upwards. The patients, after the second dose, usually discharge an incredible number of worms, mostly the long round and the long thread-worm, amounting to more than twenty at a time, the stools consisting of hardly any thing else. And, irritating as these spiculæ are to our own skin, when involved in the viscid materials with which they are mixed up, they do not seem to form an inconvenient medicine; and Dr. Bancroft never saw any evil produced by it. Of its effects upon the vermicular ascaris, he says, he cannot speak, as he has not seen it tried for this variety of invagination. For this last purpose, the best mode of employing it is in the form of mucilaginous injections. It was a favourite medicine with Dr. Macbride, who has warmly recommended it.‡

Of the vermifuges that seem chiefly to operate on worms, by attacking them internally, and to expel them by destroying their life, it may be observed, that almost all of these possess great pungency and bitterness; but that those which have obtained this character, and are bitter alone, are but little entitled to it, and are only of use when combined with some acrimonious irritant. We have already remarked, that even the intense bitter of the colocynth does not destroy worms: and Dr. Cullen judged the same respecting the seeds of the *artemisia santonica*, from their repeated anthelmintic power, vernacularly called WORM-SEED, so warmly espoused by Baglivi, and supposed, at one time, to be a specific against the long-worm. "It is said," observes Dr. Cullen,

GEN. XI.
SPEC. III.
Helminthia.

Dolichos pruriens, or cowhage.

By whom first recommended.

How administered.

Powerful effect.

Second class of vermifuges.

A bitter principle in these not sufficient alone.

Shown by the seeds of *santonica*.

* Med. Trans. of the College, vol. ii. p. 82. 202.

† Essay on the Natural History of Guiana, London, 1770.

‡ Introduction to the Theory and Practice of Medicine.

GEN. XI.
SPEC. III.
Helmin-
thia.

“to be the lumbrici teretes (the long round-worm, *ascaris lumbricoides* of the present system), to which they are especially adapted;” but, from Redi’s experiments, it appears that bitters are not an immediate poison to these animals; and Professor Murray properly observes, that “if the semen santonicum (worm-seed) according to Baglivi’s experiments, operates more quickly, it must be by something else than its bitterness that this seed operates. I am uncertain if I have ever been possessed of the best kind of this seed, but must say, that what I have seen has hardly ever appeared to me to be a powerful medicine.”* So far as my own observations extend, I can confirm this opinion. But the seeds are so often adulterated with those of other plants, and especially those of southern-wood, that it is difficult to speak with precision.

Other an-
thelmintics,
combining
a bitter with
an acrid
principle.

The same remark may be made in respect to tansy, savine, rue, bastard dittany, or fraxinella (*dictamnus albus* Linn.), and note the dittany of Crete, which is an origanum, the seeds of the *chenopodium anthelminticum*, or worm goose-foot, angelica, and many other leaves and seeds of slighter efficacy, which have had their day, and are forgotten, some of them undeservedly so. They have all more or less a bitter principle, in combination with some acrid quality, which exacerbates the energy of the bitter, and renders it doubly obnoxious to these internal parasites. And it is to these principles we are to ascribe the efficacy of the pomegranate root, one of the most common, and, according to Dr. Ainslie, one of the best established vermifuges in India.† Linnæus asserts the angelica (*angelica archangelica*) to be peculiarly serviceable in expelling the gordius, or hair-worm; and that it is in common use for this purpose in Lapland, where this variety of vermination is indigenous.

Asafoe-
tida; its an-
thelmintic
principle
uncertain

but its
power pro-
bably de-
rived from
a like union
of virtues.

On what ground asafoetida is to be held as an anthelmintic, I do not exactly know. Hoffman regarded it as one of the most powerful medicines in the vermifuge class; and Dr. Cullen tells us, that he has no doubt of its being entitled to a place in the class, though he confesses that he has seldom found it effectual; which, however, he imputes to our not having it in so recent and diffusible a state as were to be wished. It is very probable, indeed, that it loses much of its virtues with the loss of its freshness; for Kæmpfer informs us, from his own observation, that a single drachm of the

* Mat. Med., part i. chap. ii. p. 62.

† According to M. Deslandz, it is used by the negroes of St. Domingo for the same purpose. The bark of the root may be administered in powder, the doses being from eight grains to a scruple, twice or thrice a day. The decoction employed in India against the tape-worm is made by boiling ʒij. of the bark in a pint and a half of water down to ʒix. of which ʒij. are given as a dose every half hour, until the worm is expelled, which generally occurs in twelve hours. (See Thomson’s Elem. of Materia Med., vol. ii. p. 33.)

A decoction of the rind of the pomegranate is considered to be a poison to the tænia. A broad tape-worm was put by Gómez into a decoction of it, when it instantly became stiff and motionless. (See Dict. de Méd. et de Chir., t. vii. p. 352. art. ENTOZOAIRES, par Cruveilhier.) Mr. Breton placed live tæniæ in a decoction of pomegranate bark, and also in a mixture of the powder with water, and he found that when the tæniæ were plunged in these preparations, they died in five minutes. (Med. Chir. Trans., vol. ii.) That their death arose from the influence of the bark is evident, as these worms live several hours after expulsion, when kept in simple tepid water. (See Thomson’s Elem., loco cit.) — Ed.

recent juice smells stronger than a hundred pounds of such as is commonly sold in Europe. Like the preceding medicines, therefore, it is not improbable that whatever anthelmintic virtue *asa-fœtida* possesses when fresh, depends upon a bitter principle combined with a pungent and volatile aroma.

The hellebores, helleboraster, and cevadilla, which is usually regarded as a species of *veratrum*, or white hellebore, though the specific characters have not been very clearly ascertained, are pungent bitters united with a strong cathartic power, and are hence very active vermifuges; but they are too violent for common use, for they often do more mischief than the disease for which they are a remedy. The seeds of the cevadilla are so pungent as to be caustic in their pure state, for they are usually contaminated with parsley and hellebore seeds; and are hence often employed in decoction, or some other form externally, to destroy bugs, lice, and other vermin. The dose, for a child from two to four years old, is two grains; at eight, five grains; from eight to twelve, ten. These are all powerful errhines. Tobacco is possessed of all these qualities, and unites with them a deadly narcotic power. It is hence, therefore, a decisive vermifuge; but, from its violence, can rarely be used except in injections, in which form it succeeds admirably against the small ascarides.

Gamboge seems chiefly to act as a drastic purgative, bearing down all before it; for though, when held some time in the mouth, it discovers considerable acrimony, it has few pretensions to bitterness. Yet, as it is said to be peculiarly efficacious in detaching and expelling the tape-worm rather than the other kinds, it probably acts also by some specific power with which we are not acquainted.

Some medicines, however, may be regarded as specific vermifuges; or, in other words, as acting upon worms, and detaching or destroying, by some simple quality, which proves highly offensive or poisonous to them, without affecting the bowels; and which, therefore, prepare them for rejection by any purge that may be given afterwards: the chief of which seem to be the bark of the shoots of the cabbage-tree (*areca oleracea* Linn.), the bark of the bastard cabbage-tree (*Geoffroya inermis* Linn.), and the male fern.

The two former are West Indian and American plants, and the barks are employed in the form of infusion, decoction, syrup, and even powder. Both have a mucilaginous and sweetish taste, and the first a disagreeable smell. Their destructive power depends upon no sensible quality; for though, when given in large doses, they will vomit and purge violently, they prove far less anthelmintic in this proportion than when administered in doses that lie easy on the stomach and bowels, and do not pass away with rapidity. By such retardation the worms are exposed to their full influence, and are either killed or rendered sickly, so that it is necessary to take a dose of jalap, or calomel, or both, for their removal. The vermifuge is given in the morning, for eight or nine days in succession, and the purgative on the day ensuing. From the offensive smell of the *Geoffroya*, it has also been called bilge-water-tree. It was first brought into notice in our own country, as a common and almost infallible vermifuge in Jamaica,

GEN. XI.
SPEC. III.
Helmin-
thia.

Hellebore
and cognate
plants.

Tobacco.

Gamboge.

Specific
vermifuges.

Geoffroya
inermis, or
bastard
cabbage-
tree.

GEN. XI.
SPEC. III.
Helmin-
thia.

by Mr. Duguid*, and afterwards more fully described and recommended by Dr. Wright.† The decoction is made by boiling an ounce of the fresh-dried bark in a quart of water till it acquires the colour of Madeira wine: the syrup is prepared by adding sugar to the decoction. The former has found a place in the extant Edinburgh Pharmacopœia.

Areca ole-
racea, or
true cab-
bage-tree.

The *areca oleracea* has been long known to the world as a valuable plant, for other purposes than the present. Its medulla, or pith, forms an excellent sago; and its green tops are cut and eaten as cabbages: whence, indeed, its vernacular name of cabbage-tree. For a knowledge of its virtues as an anthelmintic, we are, however, chiefly indebted to Dr. Rush, who principally tried it in the form of syrup, which is of a pleasant taste, and which he asserts to be an infallible antidote. It is used, he tells us, very generally by physicians in the West Indies; and he himself has employed above thirty pounds of it, without knowing it to fail in a single instance. It is especially available against the long-worms. It was, antecedently to this, tried at Edinburgh, in the form of powder, but relinquished, as too rough and violent a medicine. In that of a syrup, it is sufficiently mild, and neither purges nor vomits, but in an overdose.‡ Dr. Monro has since introduced it into St. George's Hospital, and in various cases found it successful.§

Filix mas,
or male
fern.

Its destruc-
tive prin-
ciple over
worms not
thoroughly
known.

And hence
differently
esteemed by
different
physicians.

The *filix mas*, or male fern, is not the only species of the ferns whose roots have been employed as simple vermifuges; for the *osmundia regalis* has acquired, with some practitioners, as high a reputation; but the favour of the public has been so much more extensively bestowed on the former, as to enable it altogether to eclipse the pretensions of its rival. It is very difficult to say on what the destructive power of the male fern over worms, and especially the tænia, depends; for, to the taste, it discovers but little activity, and has little or no aroma. It is glutinous, sweetish, very slightly bitter, and sub-astringent, may be taken in very large quantities, and appears to be incapable of expelling worms, how much soever it may destroy them, without the aid of active cathartics. And hence, many writers of authority, and among the rest Dr. Cullen, are doubtful of its possessing any anthelmintic power whatever.|| The German writers, however, give examples of tænia discharged whole, or in long portions, and perfectly dead, after an exhibition of repeated doses of this medicine, where no cathartic whatever was made use of; and Dr. Parr asserts, that he has met with like examples in his own practice. And hence it appears to exercise some poisonous effect on worms, though harmless to the human stomach.

Used by
Madame
Nouffleur.

Her patent
preparation.

About the year 1770, the male fern was brought into great notice in Switzerland and France, by the celebrated Madame Nouffleur, who, under her own process of using it, boasted of it as a specific, but kept the process to herself. The secret was at length purchased by the king of France, and liberally communicated to the world. The patient, according to M. Baûmé's state-

* Essays, Physical and Literary, vol. ii.

† Phil. Trans., vol. lxxvii.

§ Edin. Med. Comm., vol. ii. p. 97.

‡ Edin. Med. Comm., vol. i. p. 329.

|| Mat. Med., part ii. chap. i. p. 41.

ment*, after being prepared at night by an emollient clyster, and a supper of panada, is, early the next morning, to take three drachms of the fern at a dose, and to repeat it instantly, if the stomach should reject it. Two hours after which he is further to take a bolus, consisting of twelve grains of calomel, twelve grains of resin of scammony, and five grains of gamboge, which, it must be confessed, seems admirably calculated for a triumphant issue in some way or other; for it will probably either kill the worm or kill the patient. It is by no means necessary to give so violent a cathartic.†

It is far less difficult to account for the real or supposed specific virtues of the Indian-pinks, or worm-grasses, for there are two species of the spigelia that have been employed for this purpose: *s. anthelmia*, and *s. marylandica*; and for those of the Indian scabious shrub, called by the natives cattu schiragaam. These are all acrid narcotics; in large doses, as above two drachms, or two drachms and a half, sometimes purging violently, sometimes producing vertigo, dimness of sight, drowsiness, and clonic convulsions; and sometimes producing all together: and hence, the same violent effects being excited, perhaps in the parasitic worms as in the patient, it is not to be wondered at that they should fall a sacrifice to them, or endeavour to save themselves by a timely and rapid escape. The scabious shrub, however, seems to act more feebly than the Indian pinks, and is little to be depended upon; while the latter are far too acrimonious for general use.

Before closing the subject, I will just observe that Dr. Friske, of Brunswick, has lately employed electricity as an anthelmintic, or rather with a view of killing the worms in their mucous domiciles, by passing powerful shocks through the abdomen. He thinks he has by this plan destroyed even the tænia; yet he does not choose to rely upon this practice without the use of active cathartics.

There is also a much milder remedy, that has been adopted in Germany, upon the efficacy of which I cannot speak from personal knowledge, but which is well worthy of attention; and especially in respect to patients of irritable stomachs and emaciated constitutions; and that is, the use of mare's milk, particularly in cases of tænia.

[Notwithstanding the kind of argument brought forward by Cruveilhier against the reality of worm-diseases, the most experienced practitioners agree, that worms frequently derange the constitution, and that, if you can free the patient from them, his health will return. But, there is reason to believe, that, in many instances, worms are induced by bad health. Hence, as Dr. Elliotson explains, in his valuable lectures, there are often two indications in the treatment: one is, to expel the worms; the other is, to endeavour, by every possible means, to restore the health;

GEN. XI.
SPEC. III.
Helmin-
thia.

Indian
pinks, or
worm-
grasses.
Indian
scabious
shrub.
All acrid
narcotics.

Electricity
as an an-
thelmintic.

Mare's milk
in cases of
tænia.

Sulphate of
iron.

* *Elémens de Pharmacie. — Précis de Traitement, &c. publié par ordre du Roi. Paris, 1775.*

† The method of Bourdier, formerly physician to the Hôtel Dieu at Paris, consisted in giving the patient, before breakfast, ʒj. of sulphuric ether in a glassful of the decoction of the root of the male fern. A few minutes afterwards, a clyster, similarly composed, was administered; and, in an hour, ʒij. of oleum ricini. This plan was continued for three days. — Ed.

GEN. XI.
SPEC. III.
Helmin-
thia.

“to take care that the patient has wholesome food, and to put the digestive organs into the best order you can. If this be done, you will frequently find worms disappear, without any other means being employed. Without giving any purgative medicine whatever — without doing any thing to expel or destroy worms, you will find, in a great number of cases, where children have become their prey, they will spontaneously cease. Children are far more subject to ascarides and lumbrici than adults, and a great number of children have them at a particular time; but, as puberty arrives, the constitution is less favourable as a habitation for worms, and they cease spontaneously.”]

GENUS XII.

PROCTICA.

PAIN OR DERANGEMENT ABOUT THE ANUS, WITHOUT PRIMARY INFLAMMATION.

GEN. XII.
Scope of
the genus.

THE name of this genus has been taken from Linnæus; Segar and Macbride have formed a like genus, under that of Proctalgia. In the scope in which it is here employed, the author included six species; all of them occasionally met with as idiopathic diseases, though several of them, perhaps, more generally as symptoms or sequels of other affections. [The species, proctica simplex, or simple pain at the anus, has now been omitted by the editor as an unnecessary distinction, throwing no light either on pathology or practice. The species are therefore reduced to five:—]

- | | |
|-------------------------|---------------------------------------|
| 1. PROCTICA SPASMODICA. | SPASMODIC STRICTURE OF THE RECTUM. |
| 2. ————— CALLOSA. | CALLOUS STRICTURE OF THE RECTUM. |
| 3. ————— TENESMUS. | TENESMUS. |
| 4. ————— MARISCA. | PILES. |
| 4. ————— EXANIA. | FALLING DOWN OF THE FUNDA- MENT. |

SPECIES I.

PROCTICA SPASMODICA.

SPASMODIC STRICTURE OF THE RECTUM.

PAIN IN THE RECTUM REMITTENT, SOMETIMES INTERMITTENT;
INCREASED DURING EXPULSION OF THE FECES; VOLUME OF
THE FECES SLENDER BUT VARIABLE; RIGID GRASP OF THE
SPHINCTER ON INTRODUCING THE FINGER; STRUCTURE OF
THE BOWEL SOUND.

STRICTURES of the rectum are produced by a spasmodic contraction of its sphincter muscles, or by a thickening and induration of its coats. The first forms the species before us: it is the simplest and least formidable of the two affections, though generally very obstinate; it also occurs by far the least frequently, and has hence attracted but little of the attention of medical writers. The second, which often terminates in a scirrhus disease, will be found to constitute the next species.

The glandular structure of the rectum renders it peculiarly irritable, and the natural arrangement of the fibres of its sphincters give it an habitual tendency to contract. It is hence easy to conceive, that any undue stimulus may excite an inordinate degree of contraction in the sphincters, which may be propagated to a greater or less degree of ascent through the muscular tunic of the bowel. This inordinate action will, at first, be disposed to cease on a cessation of the stimulating cause; but if the stimulating cause be frequently repeated, or of long duration, the contraction may become permanent, and continue to exist after the cause has been removed.

A like predisposition to inordinate and permanent contraction may take place, as Mr. Copeland has ingeniously remarked*, from the peculiar structure or peculiar extent of the sphincter fibres in particular individuals. Anatomists have not come to an unanimous agreement, whether these fibres, issuing from the exterior and the interior surfaces of the extremity of the rectum, and freely decussating and intermixing in its substance, be two distinct muscles, or only a single one. The older anatomists seem to have been of the latter opinion; Dr. Baillie, M. Petit, and M. Portal speak of them, and describe them as distinct sphincters. Be the fact as it may, we sometimes find, that the two layers of fibres do not act correspondently, and that the contractile power of the one follows, instead of keeping pace with, that of the other, or evinces some other mode of inaccordancy, so that the entire muscle is seldom left in a state of perfect rest and relaxation. And we also find, that, in some individuals, even where the action is harmonious, the contractile organ is too broad or too powerful to be overcome by the expulsive power of the abdominal muscles; and con-

GEN. XII.
SPEC. I.
Proximate
cause.

Predispos-
ing causes.
From the
natural ar-
rangement
of the fibres
of the
sphincter.

From a
peculiarity
of their
structure in
different in-
dividuals.

* Obs. on the Principal Diseases of the Rectum and Anus, sect. iv.

GEN. XII.
SPEC. I.
Proctica
spasmodic^a.

sequently, that the feces are expelled less frequently and less freely than they ought to be; whence a habit of costiveness is induced, and the confined excrement, becoming acrimonious by its lodgment, forms a permanent source of irritability, and is constantly augmenting the contractile propensity.

Habitual
use of active
purgatives.

Any other local irritation, under such an irregularity of muscular structure, must have a like effect: as a daily use of acrid purgatives, in small quantities, with a view of counteracting costiveness; irritable caruncles, or excrescences at the verge of the anus; a turgescient and especially a varicose state of the internal hemorrhoidal vessels. And even where there is no such irregular construction of the sphincters as we are now contemplating, any of these accidental sources of stimulus, in a debilitated and irritable habit, or a debilitated and irritable state of the alimentary canal, in which all of them are most prone to occur, may lay a foundation for the same complaint.

Causes.

Mr. Copeland has favoured the world with some valuable remarks upon this disease*; but the only writer who has hitherto distinctly described it, by what may be called a close and full-length portrait, is Dr. Baillie†; and I shall avail myself of his words, as containing a correct expression of the complaint.

After noticing that strictures of the rectum are almost constantly produced by a thickening of its coats, in the progress of which ulceration very commonly takes place on the inner surface of the bowel, and the patient is ultimately destroyed, as the ulcer has no tendency of itself to heal, and the art of medicine has hitherto failed in communicating to it any healing disposition, this distinguished pathologist proceeds as follows:

Description
by Baillie.

"Another kind of stricture, however, occasionally occurs in the rectum, much less formidable in its nature, which is very rare, and has hitherto been taken little notice of by practitioners. This is not attended with any diseased structure of the coats of the rectum, but depends upon a contraction, more or less permanent, of the sphincters of the anus.

"A good many years ago, a very well marked case of this kind fell under my notice, an account of which it may not be improper to communicate to the College.

"The patient, in whom this disease occurred, had been long subject to an herpetic eruption on his right leg. This suddenly disappeared, and a certain quantity of blood was then daily evacuated by the bowels at the time of passing a stool, for five or six months. When the discharge ceased, there came on a good deal of difficulty in having a motion, which was immediately followed by a considerable sensation of pain in the very lowest part of the rectum. This pain generally continued from a quarter to half an hour, and then subsided entirely until the next time of having a motion. When the stools were examined, they were found to be very small in their diameter, to be flattened upon their surface, and to be serpentine or twisted. In the course of the disease, when there was an effort to have a motion, the external sphincter of the anus would sometimes hardly open itself, so that fluid feces only would escape at such times, and in small quantity; or if any

* Obs. on the Principal Diseases, &c., sect. iv.

† Med. Trans., vol. v. art. ix.

solid feces were allowed to pass, they were so squeezed by the very narrow aperture of the sphincter, as to become nearly as thin as a riband. At other times, the sphincter was much more disposed to open itself, and the stools were then of a considerably larger size, and of a less flattened shape. At no time, however, the motions were of the usual size, or of a perfectly cylindrical form. An examination of the rectum was occasionally made per anum, and the rectum was always found to be so much contracted as to admit with difficulty the fore-finger. This contraction extended to the upper limit of the internal sphincter of the anus, above which the cavity of the bowel was of its usual size. The internal membrane of the rectum in the contracted part was perfectly healthy. It was soft, not thicker than usual, and moved very readily on the inner surface of the contracted sphincter. The patient was in good general health, looked well in his countenance, was not the least emaciated, and his pulse was of the natural frequency.

"The patient was very averse to the introduction of a bougie, and this instrument was never passed into the rectum. Nothing therefore was done, except keeping the bowels free from costiveness, and pursuing a very temperate mode of living. The disease gradually became very much less, and although it has not altogether subsided, yet hardly any inconvenience is felt from the remaining degree of contraction. It is now nearly seventeen years since the commencement of the disease.

"This case is very different in its nature from the usual stricture of the rectum, and it is of considerable importance that it should be distinguished from it in practice. In the one case, the prognostic would be favourable; and in the other case, it would be generally very much the contrary. Upon a slight degree of attention, the two cases might be confounded, but when accurately examined, they may at all times be clearly distinguished from each other. In both cases, the feces will be found to be flattened in their shape, small in their size, and in some degree serpentine or twisted; but the other symptoms will be found to be very different. In the common stricture of the rectum, the situation of the stricture is generally two or three inches above the outer sphincter, and there is a sound capacious portion of the bowel between the stricture and this sphincter. At the seat of the stricture the coats of the rectum are felt to be more or less thickened, and, not uncommonly in the cavity of the stricture, there is a hard irregular ulcer. Although this disease has in its early stages little influence upon the constitution, yet when it has made a further progress, the powers of the constitution become very much weakened, great emaciation generally takes place, and the patient is destroyed. In the other species of stricture produced by a contraction of the sphincters of the anus, the contraction is found upon examination to be at the anus, or very lowest extremity of the rectum, the inner membrane of the rectum is discovered to be sound*, and the general health is not impaired."

In a particularly obstinate case of spasmodic stricture of the rectum, that fell under the care of our author, bougies of all sizes

GEN. XII.
SPEC. I.
Proctica
spasmodica.

* See Fr. Salmon on Stricture of the Rectum, p. 19. Lond. 1798. 8vo.

GEN. XI I.

SPEC. I.

Proctica
spasmodica.This proba-
bly an ex-
treme case.In slighter
cases, bou-
gies ser-
viceable.Vapour
bath.Local ap-
plications
in the above
case of no
use.Idiosyn-
crasy pre-
vented the
use of
opium.Its singular
effects.Belladonna
of no use ;and at
length mis-
chievous.Both might
be service-
able in
other cases.Æthiops
mineral and
sulphur
found a
convenient
aperient.

and descriptions were tried; and some tubercles, which were situated at the verge of the anus, were repeatedly cut away; but, without success. He adds: I cannot, however, but regard this as an extreme case; and, in those of less violence, should still recommend the daily use of bougies of as large a size as can at first be borne without much inconvenience, gradually increasing them in diameter: for where the resistance is capable of being overcome, this is the most effectual method. In the meantime, vapour baths, or the warm bath of a bidet, may occasionally be used with advantage; and where there are exacerbations of pain, they may often be taken off by small opiate injections, not exceeding an ounce or an ounce and a half in quantity.

In the case above referred to, little benefit was ever derived from local applications of any kind, whether in the form of vapour, warm water, or cataplasms. It was most unfortunate that opium could not be had recourse to; for in every proportion, whether large or small, it threw out a lichenous rash over the surface of the body, but more especially over the extremities, possessing a heat, itching, and pricking more intolerable than the prickly heat of the West Indies, and which was almost sufficient to excite madness. From the dilatation produced in the orbicular fibres of the iris by a drop or two of infusion of belladonna, I recommended that the bougies, when they were employed, should be smeared with a preparation of the same plant; but no sensible benefit was hence obtained. The belladonna was afterwards employed in the form of pills, each containing a grain of the extract. One of these, introduced into the rectum by a small ivory tube with a piston, that thrust it out when it had ascended about an inch high, was at first employed every night alone; in a few days, night and morning; and then one in the morning and two at night. No effect of any kind was experienced till the dose was thus enlarged; and here all the mischievous results of belladonna were produced, and nothing else. The tongue swelled, and lost its power; the head was confused and giddy; the mind wandered; and the sight and hearing were obtunded. Having been warned of such possible effects, and the means of removing them if they should occur, the friends of the patient had immediate recourse to the plan laid down; and, by the aid of copious stimulating and cathartic injections, and cordial draughts, a recovery was accomplished in about twelve hours.

It is obvious, however, that this case was governed by an idiosyncrasy not often to be met with: and hence, notwithstanding the failure both of opium and belladonna in a single instance, I should feel it my duty to try either or both, with unhesitating freedom, in other examples, and should do it with a strong confidence of benefit. Mr. Copeland informs me, that he has often been successful with the latter; and, in some instances, where every other attempt at relief had failed.

I will just notice farther, that, in the above case, after a trial of almost all the aperients in the *Materia Medica*, the most convenient has been found about eight or ten grains of the black sulphuret of mercury, with about two drachms of sublimed sulphur in addition.

I have the satisfaction of adding, that, since the above par-

ticulars were written, the disease, though not entirely subdued, has been considerably diminished, and comparatively produces but little inconvenience.

Other cases, that have occurred to me of the same complaint, have been less painful and far more easily overcome. In a young lady of eighteen, whom I now see only occasionally, and who could never be persuaded to use a bougie, it has given way, after nearly two years' standing, principally by a use of the hip-bath, for half an hour every morning, before she made an effort to evacuate the bowels.

GEN. XII.
SPEC. I.
Proctica
spasmodica.

SPECIES II.

PROCTICA CALLOSA.

CALLOUS STRICTURE OF THE RECTUM.

DIFFICULT AND PAINFUL EXPULSION OF THE FECES; FECES LAX, OR OF INVARIABLE SLENDERNESS; PERMANENT CONSTRICTION FELT BY THE FORE-FINGER ABOVE THE SPHINCTER; STRUCTURE OF THE BOWEL THICKENED AND INDURATED IN THE CONSTRICTED PART.

A CAREFUL attention to the pathognomonic characters, laid down in the above definition, will easily distinguish this species from the preceding, which, though more troublesome in its commencement, is far less formidable in its issue; since the latter, if not timely attended to, is frequently found to terminate in an ulcerated scirrhus, and sometimes a cancer.

GEN. XII.
SPEC. II.

The disease for the most part commences its attack so insidiously, that the patient has no suspicion of the real nature of the case. He feels a troublesome costiveness, which he ascribes to almost every thing rather than the real cause, and endeavours to alleviate it by various kinds of cathartics. These, while they afford temporary relief, add, by the habitual irritation they produce, to the primary and unsuspected malady; and the next symptom, perhaps, is that of piles, or what is so conceived from a varicose state of the hemorrhoidal vessels, and the natural tendency of all mucous canals to evince most excitement at their extremities.

Disease commences insidiously,

and hence often ill-treated from mistake.

In the mean time, the morbid part of the gut continues to thicken and harden in its coats, its bore diminishes in diameter, and the efforts to expel the recrement become more violent. The stools are now of a still slenderer and often of a twisted or serpentine form, and have the appearance of convoluted earth-worms, or butter squeezed by a piston through a confectioner's syringe.

Progress of the disease.

Thus far, however, the constitution suffers perhaps but little; and the patient, to his friends, may appear to be in the zenith of health. But if the rectum be tried by the finger or a bougie, a morbid change of structure will be perceived, that threatens the most alarming results. The sphincters will probably be found pliable and free from disease, and the part of the gut immediately

State of the gut when the disease has formed there.

GEN. XII.
SPEC. II.
Proctica
callosa.

above them, for two, three, or more inches, will be equally healthy; but the stricture, as soon as it is reached, will, perhaps, scarcely admit the passage of the finger, and oppose its entrance by the semblance of a hard cartilaginous ring; or if it be not thus indurated and rendered scirrhus, it may be studded by a circle of tubercles, or intersected by a network of membranous filaments. And if a sound or bougie be passed through the neck of the stricture, another stricture may be found higher up, and again repeated to the sigmoid flexure of the colon; where perhaps the disease originated, and whence it has worked its way downwards; the colon possessing naturally its least diameter at this point; and the feces being here most easily delayed in their progress, not only from this increased narrowness of the passage, but also from the curved line in which they have to move forward into the rectum.

Painful
effects.

Whether the stricture be thus complicated or not, the narrower its aperture becomes, the greater the difficulty of passing the feces, which necessarily accumulate, and distend the bowel above, excite eructations and gripings, and occasionally lay a foundation for that species of colic which we have already described as issuing from this source, under the term *colica constricta*. The feces can now be discharged only in a fluid state; and there is a sanious oozing from the anus, accompanied with a certain degree of tenesmus, which is rather troublesome than severely painful.

Abscesses
and ad-
hesions.

“At this period,” observes Mr. Copeland, who has admirably described the progress of the disease*, “abscesses very frequently form in the neighbourhood of the anus, and sometimes break into the vagina of the female, and the feces are discharged through the fistulous orifice. In the male, an adhesion takes place to the bladder, and the abscess† discharges itself with the urine, and sometimes feces and wind are voided by the urethra. But more frequently the matter makes its way through the nates, as in cases of common fistula, for which disease it is not unfrequently treated. The patient often continues a long time in this distressing situation, for none of the vital organs are affected; till, at last, worn out with the pain and the discharge, or perhaps a total obliteration of the rectum, he yields to his fate. This is usually the progress and issue of the disease when it is not early discovered; and, I must confess also, sometimes the termination when it is: that is, when the parts are attacked with cancerous ulceration.”

At length
terminating
fatally.

[In one case, however, which the editor attended at Halliford, the tenesmus was particularly severe. The disease, indeed, corresponded very closely to the following description. With the usual symptoms of stricture, there were the most acute lancinating pains in the part, extending through the pelvis to the loins and thighs; and every now and then the pains were followed by a sudden gush of bloody discharge from the bowel. When any feces passed, the suffering was extreme; and, for several months previous to the fatal termination of the disorder, there was a peculiarly fetid discharge from the anus. The patient was a gardener, more than seventy years of age; and he did not sink till his stomach became disordered. During the latter stages of the disease, the

* Observations on the Principal Diseases of the Rectum and Anus, sect. i. p. 11.

† Petit, Œuvres Posthumes, tom. ii. p. 93.

functions of the bladder were very much disturbed. The passage of a bougie into the rectum could never be endured, and even a glyster-pipe was intolerably painful.

The causes of the present disease are completely unknown. It is generally remarked by writers that it may originate from any kind of irritation of the rectum; yet, without some other circumstances conducive to the changes of structure, forming what is usually called a scirrhus-contracted rectum, simple irritation of the bowels will not bring on this afflicting disease. The case is sometimes suspected to arise from a peculiar morbid condition of the mucous glands of the rectum.* Dr. Baillie entertained this opinion, which he thought was confirmed by the fact, that such glands are most numerous at the lower part of the gut, where the disease is also most frequent. If this be the case, however, it only refers to the structure in which the disease commences, and throws no light on the cause of its commencement. The probability is, that the complaint is dependent on constitutional causes, like every other form of scirrhus. Desault found the disease to be much more common in the female than the male sex, in the proportion of ten to one: the subjects of it are also mostly advanced in years. This tends to support the opinion already delivered, respecting the operation of constitutional causes. A case was communicated to Dr. Monro, by Dr. Gregory, where the disease was ascribed to the insertion of a fish-bone in the coats of the rectum, as discovered after death.† The particulars recorded, however, do not warrant this inference, since the stricture might have occasioned the stoppage of the bone, and not the bone the formation of the stricture. This, at least, is the editor's view of the subject, and it is confirmed by various examples, in which cherry-stones or other foreign bodies have been detained in other parts of the intestines by strictures.‡ The idea of the disease ever originating from syphilis is now abandoned by every surgeon of judgment. Mr. Salmon refers to two specimens of the disease in an advanced stage: in both cases the mucous and muscular coats of the bowel have been absorbed, in consequence of the pressure of a new-formed substance, which, in one instance, has made its way into the bladder, and, in the other, into the vagina.§ These two cases, then, present one feature of carcinoma of the breast, namely, that which consists in the substitution of a new-formed substance for the original texture, which is absorbed. The projection of the new mass into the bladder and vagina, however, would rather indicate a character of fungus hæmatodes.]

The existence of transverse filaments, like that of cancer, is generally preceded by scirrhus, as remarked in the following passage of Dr. Baillie. The scirrhus "sometimes extends over a considerable length of the gut, viz. several inches; but generally it is more circumscribed. The peritoneal, muscular, and internal coats are much thicker and harder than in a natural state. The muscular, too, is subdivided by membranous septa, and the internal coat is sometimes formed into hard irregular folds. It often happens that the surface of the inner membrane is ulcerated, producing

GEN. XII.
SPEC. II.
Proctica
callosa.
Causes.

Striking
change
produced in
the struc-
ture of the
gut.

* Salmon, on Stricture of the Rectum, p. 63.

† See Monro's Morbid Anat. of the Human Gullet, &c., p. 22.

‡ See case by Salmon, op. cit. p. 31. § Op. cit. p. 63.

GEN. XII. cancer. Every vestige of the natural structure is occasionally lost, and the gut appears changed into a gristly substance." These remarks are strikingly illustrated by well-engraved figures in the author's *Morbid Anatomy*.*

SPEC. II.
Proctica
callosa.

Transverse
filaments
often
formed
early, and
may be re-
moved at
times easily.

In a few cases of irritation, the transverse filaments have been formed before the thickening of the gut has become callous, and have nevertheless been accompanied with all the painful symptoms just noticed. If, in this incipient state of the disease, these filaments be carefully removed, it has often happened that an easy and radical cure has followed in a short period, of which Dr. H. Y. Jameson of Baltimore has published a striking and instructive example.†

Case, and
dissection,
by Ruysch.

Ruysch gives an instance of a scirrhus structure of the rectum, which produced great agony, and terminated fatally, excited, as he supposed, probably without sufficient grounds, by a stricture of the urethra. On dissection, the pelvis of each kidney, and the middle of the right kidney, were found loaded with calculi; the rectum, through its entire length, was nearly of the thickness of the thumb, and so indurated as to render it difficult to say whether the incrassation should be called flesh or cartilage: the canal was not wider than a straw; and so firmly had the intestine adhered to the sacrum, that it could only be separated by a mallet and chisel, the point of a knife having been previously tried in vain.‡

Treatment.

[When the texture of the scirrhus-contracted rectum is considered, it must be confessed, that there is not only great difficulty in putting faith in the efficacy of any internal medicines, but also in giving credit to the statements of benefit derived from direct applications to the diseased part itself. Experience must be heard, however, and the authority of Desault can be brought forward in confirmation of the power of tents and bougies to relieve and even cure this formidable disease. Notwithstanding what was once asserted, pressure will not cure cancer of the breast; and it is puzzling to understand why it should ever succeed in cancerous affections of the rectum, unless the latter be presumed to be of a different nature from scirrhus affections of other organs. Yet Dessault declares that the disease can be cured, and has recorded examples of the successful treatment of what he conceived to be scirrhus of the rectum. It is not every surgeon, however, that bows

Pressure.

to this doctrine: and Professor Gibson delivers his own judgment very unreservedly when he remarks that, whatever may be said to the contrary, genuine scirrhus, or cancer of the rectum, is absolutely incurable.§ A similar prognosis is given by Mr. Salmon||. In the example which I attended at Halliford, the bougie could never be endured. Some palliation of the sufferings was produced by the exhibition of hyoscyamus, joined with hemlock, opium, or the blue pill; and by the occasional use of castor-oil, anodyne clysters, the slipper bath, and fomentations. Our author, as the annexed remarks show, had confidence in the bougie.]

In the earlier stages of this disease, the steady use of a bougie, firm, but not harsh, and lubricated with oil, of a size adapted to the diameter of the stricture, so that it may press against its sides

* Plate iv. † American Medical Recorder, April, 1822. ‡ P. 358.

§ Institutes and Practice of Surgery, vol. i. p. 293. || Op. cit. p. 64.

with a force short of uneasiness, will afford, in conjunction with gentle laxatives, the best chance of cure, and has in very numerous instances completely succeeded. The bougie may be retained at first for only a few minutes, as, on its earliest use, it will probably give pain, and irritate; but by degrees it should be borne for a longer period of time, and at length for several hours in a day. The pressure will promote absorption, and consequently reduce the morbid thickness of the coats, and hereby enlarge the diameter of the intestine; and, as this last change occurs, and advances, it should gradually be met by a bougie of larger calibre, till the canal is restored to its proper dimensions. And, even after this, it will be proper to return to the bougie occasionally, for a few minutes at a time, that there may be no relapse from the existence of a predisposing habit.

Nothing is so well calculated as the bougie, moreover, to break away that network of filaments which, as we have already observed, is sometimes united with an incrustation of the rectum, and spreads from one side of it to another. In this case there will usually be found at first a considerable degree of pain, and sometimes a considerable degree of hemorrhage; but a courageous perseverance will triumph over these, and amply reward the patient's exertions. And the tubercles, which are so apt to form on the loose and inner coating, will often yield and be carried off by the same means.

When, however, the disease does not yield to this plan, or has reached a more serious stage in its destructive progress, it becomes a direct subject of operative surgery: and a cure may yet be obtained by a removal of the tubercles by ligature or the knife; or a division of the thickened ring by a curved and probe-pointed bistoury. When, indeed, the disease is of so complicated a character as to embrace at the same time a contraction of the sphincter, M. Boyer has proposed also to divide this muscle; and asserts, that he has often done it with success. But as it is not the intention of the present work to enter upon the province of practical surgery, I shall not pursue the subject any further.

GEN. XII.
SPEC. II.
Proctica
callosa.

Bougies :
their frequent success when employed early.

How to be used.

In what respect they act beneficially.

Sometimes a case for operative surgery alone.

Division of the sphincter.

SPECIES III.

PROCTICA TENESMUS.

STRAINING.

PAINFUL AND PERPETUAL URGENCY TO GO TO STOOL, WITH DEJECTION OF MUCUS ALONE AND IN SMALL QUANTITY.

WHEN this complaint is idiopathic, it is the result of local irritation, mostly produced by cold; the passage of acrid stimulating matter from the bowels; the mechanical pressure of confined enterolithi, or minute scybala; or an injudicious use of acrid cathartics, especially of aloes, which have a peculiar tendency to

GEN. XII.
SPEC. III.

GEN. XII.
SPEC. III.
Proctica
tenesmus.

Description
when
severe.

Sometimes
symptom-
atic only.

Affections
of the pro-
state gland,
uterus, or
urethra.

Treatment.

stimulate the lower part of the rectum. It is sometimes intolerably vehement, and accompanied with a protrusion of the gut; the mucous discharge is bloody, and the straining continues long after the intestine has emptied itself of every particle of its contents. And even when the patient has risen from stool, he will still perhaps be tormented with a burning pungent heat, and a perpetual urgency to expulsion. It is this violence of attack, indeed, that chiefly distinguishes this species from the symptomatic straining that occurs in the preceding, which is attended with but little comparative pain, and generally ceases upon the discharge of even a small portion of feces. The constant urgency and torment wear away the sufferer's strength, and sometimes extend the irritation to the bladder.

Most commonly, however, tenesmus is nothing more than a symptomatic affection, excited by some disorder of the bladder, as inflammation in its neck, or a calculus in its cavity; or by dysentery, chronic diarrhœa, costiveness, piles, worms (especially ascariides), and pregnancy; or, as just observed, by a stricture of the rectum, or its sphincter.

In all these cases, tenesmus can only be removed by a cure or palliation of the disease on which it is dependent: but where it is an idiopathic affection, a more direct course of treatment may be adverted to. If a lodgment of acrid materials form the cause, these should be freely discharged, and the irritation they have excited be subdued by bleeding with leeches, and a local application of opium, intermixed with soap and wax to prevent its being too quickly dissolved; or by small doses of ipecacuan, or of Dover's powder. In very painful extremes, opiate and mucilaginous injections will often alleviate the distress; or Goulard water with oil. Laudanum in a solution of starch is frequently employed with great benefit as a clyster; or the extract of opium may be introduced into the rectum as a suppository.

SPECIES IV.

PROCTICA MARISCA.

PILES.

LIVID AND PAINFUL TUBERCLES OR EXCRESCENCES ON THE VERGE OF THE ANUS; USUALLY WITH A DISCHARGE OF MUCUS OR BLOOD.

GEN. XII.
SPEC. IV.
Common
name of he-
morrhoids
incorrect,
and why.

THIS species has generally been described by modern writers under the name of *hæmorrhoids*, whence *hemerods* or *emrods* in old English, and *hemorrhoids* in the English of our own day. Now, the literal meaning of *hæmorrhoids*, αἱμορροΐς, is "flux of blood;" and in this sense the term was used by the Greek and Roman writers, sometimes generally, and sometimes with a special application of it to menstruation, and particularly profuse menstruation, or uterine hemorrhage, but never with a special reference to he-

morrhage from the anus, as I have already remarked in the Preliminary Dissertation to the volume of Nosology*, to which I refer the reader: and hence again, Aristotle denominates, by the term *Hæmorrhoids*, a serpent, whose bite was said to be succeeded by a violent and fatal flow of blood from the bitten vessels.† The name is, therefore, highly inadequate to the purpose of expressing, with any degree of clearness, tubercles, or even discharges from the anus; yet it becomes not only inadequate, but absurd, when employed generally to indicate a family of diseases, some of which have a discharge of mucus, instead of a discharge of blood, and others no discharge of any kind.

For these reasons, as well as others stated at large in the comment to the volume of Nosology, I have deemed it expedient to adopt the Latin term *marisca* in the stead of *hæmorrhoids*; and to limit the genus to those tumours or excrescences about the verge of the anus, which, under every view of the disease, form its prominent character.

These enlargements commonly, and perhaps in every instance, derive their existence from a turgid and varicose state of the anal or hemorrhoidal veins; for, in their simplest forms, piles consist of nothing more than varices of these veins, covered with a slight thickening of the inner membrane of the rectum, as Dr. Baillie has sufficiently shown in his illustrative plates.‡

[When piles are discriminated from mere swellings of the veins, termed *hemorrhoidal varices*, to which the practice of excision is dangerous, they are first seen in the form of small fleshy tubercles, generally of a brownish or pale red colour, and either situated within the anus, or descending from the rectum. They have rather a solid and spongy feel, and, when cut into, present a surface more or less compact and bloody, from which blood oozes, leaving the texture pale and more relaxed. When they are more external, they are paler, and generally, also, more elastic and transparent; and they appear and disappear more quickly than the former. Piles very often contain a central cavity, filled with fluid, or coagulated blood, and lined with either a smooth or granulated cyst. By means of fine anatomical injections, a few minute vessels may be demonstrated, through which the blood exudes into the central cavity, but no direct connection exists with any of the larger vessels. The cavity usually does not exceed the size of a pea; but it is sometimes large enough to hold several drachms of blood. More generally, however, there is no regular cyst, but the substance of the tumour is infiltrated with blood, which eventually becomes dark and coagulated. Common piles subside and return at uncertain periods, and they become larger and firmer, in proportion to the frequency of the attack. Often, however, after some discharge of blood, they collapse, their cavity seems to be obliterated§, and they leave merely pendulous flaps, formed of stretched skin. But, when they have been strangulated for some time by the pressure of the sphincter, repeatedly gorged with fluids, or been of very long standing; they acquire more solidity, and become permanent, varying but little in size, and forming a

GEN. XII.
SPEC. IV.
Proctica
Marisca.

Hence varied in the present system.

How produced.

* Page 55.

† De Partibus Animal., lib. iii.

‡ Morbid Anatomy, plate v. fig. 2, 3. p. 78.

§ See Sir A. Cooper's Lectures, vol. ii. p. 336.

GEN. XII.
SPEC. IV.
Proctica
Marisca.

source of almost constant pain, from protrusion, inflammation, or ulceration; or, by occasioning a distressing prolapsus of the anus. This permanent state of the tumours is referred by Mr. Calvert partly to the developement of the capillary vessels, by which the interstices are gradually obliterated, and partly to the coagulation and organization of the effused blood. Hence, the production of condylomatous tumours, and what are termed hemorrhoidal excrescences, all of which are solid, and can only be removed by the knife, or ligature. With respect to this description, the editor begs to observe, that all the several forms of piles are generally conceived, and probably with correctness, to be originally mere swellings of veins, whatever may be the solidity they afterwards acquire, or the seemingly small or indirect communication of their cavity with the venous trunks.]

Descrip-
tion.

From local irritation, produced by indurated and retained feces, or purgative stimulants, and especially aloetic purgatives; or from an undue determination of the blood to the hemorrhoidal vessels, by excessive walking or riding; or their turgescence, arising from enlargement of the liver or adjoining viscera; from the pressure of the gravid uterus on the pelvic veins; from the irritation of stone in the bladder; and often from a peculiarity of the constitution itself; the extremities of the hemorrhoidal veins are apt to become varicose, and swell into tumours; frequently accompanied with inflammatory action in the surrounding mucous follicles; the swellings enlarge gradually into caruncular excrescences, pea-sized, fig-sized, or of various other figures, sprouting about the verge of the anus, within or without; and are often so painful as to prevent either walking or sitting. Sometimes the caruncles, thus produced, are hard, florid, incompressible, without discharge, and intolerably sore to the touch. Sometimes irritation induces a secretion of whitish mucus from the neighbouring glands. Sometimes the hemorrhoidal vessels themselves, that form or supply the sprouting tumours, are so distended as to burst, and bleed freely. And occasionally the inflammatory action gives rise to the formation of caruncles of different shapes and sizes, sometimes spreading about the perinæum, but mostly existing within the verge of the anus. Whence we obtain four distinct varieties, as follow:—

| | |
|-----------------|-------------------|
| α Cæca. | Blind piles. |
| β Mucosa. | White piles. |
| γ Cruenta. | Bleeding piles. |
| δ Caruncularis. | Caruncular piles. |

αP. Marisca
cæca.
Predispos-
ing causes.

We have just observed, that piles in their simplest state consist of nothing more than varicose tumours of the anal veins, covered with a slight thickening of the inner membrane of the rectum: and I have pointed out a variety of causes predisposing to such tumours. The trivial term *cæca*, or *blind*, though not peculiarly expressive of the idea intended to be conveyed, has been applied for ages to the first example before us, which is void of every kind of discharge, whether mucous or sanguineous, and has no *eyelet*, or aperture, through which such discharge may flow, and carry off the accumulation. Mariscal tumours, Mr. Copeland conceives, are most common in persons who possess a very strong

action of the sphincter ani, and are hence habitually predisposed to a spasmodic stricture of the rectum. In such persons, he supposes, that on every expulsion of the feces, the internal membrane of the rectum, together with the vessels it contains, is protruded, and caught or detained, and some of its veins strangled by the forcible constriction of the muscle. That this is a frequent cause of piles I have no doubt, though, from their occurring in such numerous instances in persons of lax fibres and debilitated habits, it appears to me to operate less frequently than is suspected by Mr. Copeland.

Mariscal excrescences are likely to be the hardest, the sorest, and the most florid of the whole, when the result of such a cause. Where they proceed from a mere relaxation of the vascular system, or a diseased state of the larger abdominal viscera, they will sometimes acquire a considerable bulk without being highly painful; but, in this case, they are usually soft and compressible.

It will be better and more compendious to take a survey of the other varieties, before we proceed to the curative intention.

In some persons, the mucous follicles of the interior membrane of the rectum are far more easily excited to secretion than in others; as we see in many individuals the mucous membrane of the nostrils pour forth a readier and more abundant defluxion. It is in this state that the tumours assume the name of WHITE or MUCOUS PILES; and as the excretories thus easily evacuate themselves, there is much less soreness and irritation, and the tumours or tubercles are comparatively pale as well as moist; and, though often not admitting of so rapid a cure as some of the other varieties, are considerably less distressing.

It often happens that, from distention, the walls of the anal varices give way, and form BLEEDING PILES. Yet it does not always follow that blood is hereby discharged, or the tumours are diminished. For it occasionally occurs that the surrounding membrane does not give way at the same time, and consequently that the extravasated blood is accumulated in the contiguous cellular substance, and the tumours, instead of diminishing, increase from the size of a pea to that of a pullet's egg, block up the entire passage of the rectum, and are a source of very great evil. If, however, this take place at some distance above the sphincter ani, where the parts yield more easily, the pain may not be excessive; but if these enlarged tumours be seated on the sphincter, or within the range of its contractile influence, the torment induced is often intolerable.

From this difference of seat, piles from of old have been denominated external and internal; and it was imagined by Dr. Stahl and his disciples, that the former were produced by a gorged state of branches from the vena cava, and the latter from a like congestion in branches of the vena portarum. No benefit, however, can possibly result from such a distinction; nor is the distinction itself founded in fact: for all the arteries and veins that appertain to the lower part of the rectum arise so diversely, and anastomose so frequently, than an affection of one must be communicated to another, and the general result be participated by the whole.

In most cases, however, in which the varicose vessels burst, the distended and attenuated membrane that surrounds them bursts

GEN. XII.
SPEC. IV.
αP. Marisca
cœca.

βP. Marisca
mucosa.
Cause.
Character.

γP. Marisca
cruenta.
Hemorrhage not
always a
result of the
bursting of
a vein.

External
and internal
piles, the
meaning of.

Hemor-
rhage,
however,

GEN. XII.
SPEC. IV.
γP. Marisca
cruenta.
generally
follows.
Apt to
become
habitual.
Cannot be
suppressed
without
danger.
δP. Marisca
caruncu-
laris.
How pro-
duced.

Description.

To be dis-
tinguished
from other
caruncles in
the same
neigh-
bourhood.
Treatment.

Laxatives.

Peculiar
action of
sulphur.

Treatment.
Balsam of
copaiva.

In what
way useful.

at the same time, and the blood flows externally. The hemorrhage is, in some cases, very considerable: and as this variety, more than any of the others, is apt to run into a habit, the constitution occasionally becomes greatly debilitated, and often dropsical; and the hemorrhage has, in a few instances, been so profuse as to endanger life. When, moreover, a hemorrhoidal habit is once established, the flux, even if it do not undermine the health by its quantity, often becomes periodical, enters into the chain of constitutional actions, and becomes a regular condition of the corporeal weal; so that its suppression is attended with serious mischief.

It often happens, and especially during the first variety, which evinces the highest degree of inflammation, that an effusion of coagulable lymph takes place around the mariscal varix, which terminates in vascularity, and the production of a fleshy substance that still continues even after the overloaded vessels have recovered their proper diameter and tone. It is these CARUNCLES, which are rather the sequels of piles than piles themselves, that constitute the fourth variety. They are of different shapes and sizes, bulbous, soft, and compressible, red or reddish; and not unfrequently the base shrivels into a narrow neck, while the body of the caruncle enlarges and elongates so as to assume a polypous appearance.

Caruncles, not very unlike, are frequently found sprouting from the cuticle or cutis that surrounds the anus, often assuming the appearance and having much of the nature of warts; solitary or clustering, with a broad or narrow base; and which are sometimes regarded as piles, but are altogether of a different origin.

In attempting a cure of this complaint, our first attention must be directed to the cause, as far as we can ascertain it. If the bowels be habitually costive, gentle laxatives should be employed daily; and where the complaint has been induced by excessive walking or other muscular exertion, quiet and a recumbent position must be sedulously enjoined. The laxatives in either case may be the cassia or senna confection: oil of castor, where it will sit easy on the stomach with the addition of a little spirit, which is its best corrective; and sulphur. Sulphur has long been regarded as a specific for piles; but I do not know, that it possesses any other virtue than that of being a mild aperient. It seems, however, to be an aperient peculiarly calculated to act upon the large intestines; since, being soluble with difficulty in animal fluids, it dissolves slowly, and does not spend itself till it has descended to a considerable depth in the alvine canal.

Dr. Cullen was in the habit of employing in this complaint the balsam of copaiva. After observing that, like turpentine, it proves aperient, he proceeds as follows:—"Whether a certain effect of balsam of copaiva is to be imputed to this operation, I cannot determine; but must observe, that I have learned from an empirical practitioner, that it gives relief in hemorrhoidal affections, and I have frequently employed it with success."* His dose was from twenty to forty drops, properly mixed with powdered sugar, once or twice a day.

I have tried this medicine often, and when it has appeared

* Mat. Med., part ii. cap. v. p. 190.

useful, it has been chiefly in the case of mucous piles; I am hence induced to ascribe its salutary effect rather to the common principle, on which it is well known to act in irritations of mucous membranes generally, than to its laxative power.

Where the pain and tension are very distressing, relaxant cataplasms and fomentations are generally advisable. The common bread poultice, with a solution of opium, is one of the best.

The butter of chocolate may be advantageously employed for the same purpose, either as a most mild emollient ointment, in the form of a suppository, with a small portion of spermaceti, or as an exquisitely bland bougie with a nucleus of cotton.

If we can clearly refer the disease to a gorged or obstructed state of the liver, or any other abdominal viscus, the purgatives we employ may be of a more active kind, and a free use of the lancet should precede them. And if the piles should depend upon a strong entonic action of the sphincter ani, bleeding from the arm will also be highly useful; but the local application of leeches will answer better.

In every variety, indeed, in which there is much heat, hardness, and irritation, leeches will be found an important remedy; and when these symptoms are hereby removed or mitigated, we should have recourse to local tonics and astringents. The patient may sit frequently in a bidet of cold water, or apply cataplasms of cold water and crumb of bread; or, if the tumours be seated above the sphincter, use injections of cold water. With the water we may often advantageously intermix the earthy or metallic astringents, as alum, sulphate of zinc, or the superacetate of lead. Where the tubercles are not very sore, they will often yield to a layer of gypsum, or, what is better, Fuller's earth, which, however, should be rubbed into as soft a paste as possible. This is a remedy which has been long employed on the Continent*; and I have sometimes prescribed it with singular success, and have known piles, when softish and compressible, removed by it in a single night.

Several vegetable astringents are well entitled to our attention for the same purpose; and especially the powder or extract of catechu, which I have known to be serviceable to external tubercles in the form of ointment, and to internal ones in the form of an injection. And Dr. Cullen speaks with equal favour of finely pounded oak-galls, in cases where the disease is not connected with the general habit.† A mild solution of the nitrate of silver will, however, often be preferable to any other astringent.

If these should fail, the pressure of bougies should be had recourse to, and especially in piles supposed to be produced by a constitutional entonic constriction of the sphincter muscle; for, in this case, it will have a tendency to remedy both the cause and effect at the same time. Suppositories and bougies for this purpose are of long standing and high recommendation. With a view of uniting the two advantages of pressure and cold, they were formerly recommended to be made of slices of any of the cucurbitaceous fruits, as cucumber, gourd, or melon‡; but none of these

GEN. XII.
SPEC. IV.
Proctica
Marisca.

Cataplasms.

Butter of chocolate.

When the lancet should be used.

When leeches especially serviceable.
Local tonics and astringents.
Metallic astringents.
Gypsum.
Fuller's earth.

Vegetable astringents.
Catechu.

Oak-galls.
Nitrate of silver.

Bougies.

Cucumber suppositories.

* Eph. Nat. Cur. Dec. iii. Ann. iii. obs. 162.

† Mat. Med., part ii. chap. i. p. 46.

‡ Morgagni, De Sed. et Caus. Morb., Ep. xxxii. art. 12. — Lange, Miscell. Verit., p. 104.

GEN. XII.
SPEC. IV.
Proctica
Marisca.

Ivory
bougies.
Bladder
bougies.

Fistulous
ulcers often
from a
gleet.

Tubercles
when to be
removed ;

not advis-
able by
caustic.

Advantage
and disad-
vantage of
ligature.

Treatment.

are sufficiently stiff to obtain an adequate expansile force ; and hence the large rectum bougies in common use have been advised. I have sometimes seen them made of very finely polished ivory, of a conic shape, about the length of the fore-finger, with a ringlet at the base ; and the exquisite smoothness and equality of pressure they possess peculiarly fit them for the purpose. Mr. Bell proposes a bougie or tent formed of a silver tube, wrapped round with soft linen, or a piece of sheep's gut tied at one end, and then pushed to a sufficient height into the rectum, and forcibly distended with water.*

Occasionally nature has effected a cure ; and the effused substance has been absorbed without any artificial means whatever† : but more generally neglect produces the most lamentable consequences, and especially fistulous ulcers of very difficult removal ; which have sometimes indeed, as Mr. Gooch has sufficiently exemplified, wormed a sinuous path, and opened into the vagina.‡ And hence, if none of the preceding means should be found to answer, and especially if the tubercles be extremely painful and distressing, they should be removed with all expedition by ligature, caustic, or the knife. Of these, the use of caustic is by far the most unadvisable, whether actual or potential. Of the other two methods, it is not easy to say which is the preferable ; and hence each has been in favour with different practitioners. The chief disadvantage of the ligature is, that, by tying up the surrounding membrane of the intestine along with the immediate substance of the tumour, a very high degree of sympathetic irritation, and even inflammation, has at times been excited over the whole range of the intestinal canal, and even the perinæum, and to a degree that has in some instances proved fatal : the ligature appearing to act, as M. Petit observes §, in the same manner as the pressure of the tendinous rings of the abdominal muscles in cases of strangulated hernia ; and producing the same effects of incessant hiccough, vomiting, abdominal inflammation, and gangrene. This, however, rarely occurs, except when the ligature is applied round several tumours at the same time, or during their inflamed state ; for if only one be operated upon at once, and the rest in succession, the irritation has not been generally extensive, or of longer duration than two or three days. And perhaps even this might be avoided, by denuding the tumour of its external covering, as M. Petit has proposed.

The chief difficulty that attends the operation of excision is a very troublesome, obstinate, and debilitating hemorrhage, which is apt to follow, and which many surgeons have found very hard to restrain ; chiefly, perhaps, because the veins of the abdominal viscera are destitute of valves. Sir Astley Cooper has once or twice found it prove fatal ; and hence, though in his earlier years an advocate for excision, he afterwards gave a preference to the ligature.|| Excision, therefore, is chiefly calculated for the caruncular variety, and in such cases is far preferable to the ligature : but where we have reason to believe, that the varicose vessels

* Surgery, vol. ii. chap. xvi. p. 259.

† Marigues, Journ. de Méd., tom. xxxii.

‡ Cases, &c. p. 249.

§ Œuvres Posthumes, tom. ii.

|| Lectures, &c. with additional Notes by F. Tyrrell, Esq. vol. ii. p. 342. 8vo. 1825.

are of a large diameter, the knife should not be had recourse to. [Mr. Calvert, whose observations on piles are judicious, makes a practical distinction between the firmer swellings, whose cavity or cells have but a small or indirect communication with the large veins, and other tumours, which he calls hemorrhoidal varices, and consist entirely of dilated veins. The latter are the cases to which the practice is inapplicable. Hemorrhoidal varices are generally of a dark, or bluish colour, soft and elastic to the touch, resembling in this respect ripe grapes; and, when compressed by the finger, they are evidently diminished, but return to their former state as soon as the pressure is removed. Their shape is also very different from that of other hemorrhoidal tumours; being broader at the base, rounder, and sometimes distributed in irregular clusters, like similar affections of the *venæ saphenæ*. Tumours may also be presumed to be of this nature, when they can be traced from the anus far up the rectum.*] Cutaneous excrescences about the anus, erroneously denominated piles by the vulgar, may be taken off with a knife or a pair of scissors, in any number, or to any extent, without reserve.

GEN. XII.
SPEC. IV.
Proctica
Marisca.

SPECIES V.

PROCTICA EXANIA.

FALLING DOWN OF THE FUNDAMENT.

INVERSION AND PROLAPSE OF THE VILLOUS TUNIC OF THE RECTUM, FROM ENTONY OR RELAXATION OF THE SPHINCTER.

THIS is a very common and a very troublesome disease: but it is capable of a perfect cure in most cases, and of great relief perhaps in all. There are two varieties of it, proceeding from the two opposite causes of atony and entony, and which demand a very different mode of treatment.

GEN. XII.
SPEC. V.

| | |
|---------------------|-------------------|
| α Atonica. | Relaxed Exania. |
| β Spasmodica. | Spasmodic Exania. |

Where the action of the sphincter is feeble, it collapses readily, and often imperfectly; and the part of the rectum that always descends towards the verge of the anus upon a protrusion of the feces, instead of being retracted with elasticity, remains exposed, or ascends imperfectly. Yet there is little pain or tumour, and reduction is easy. Under such circumstances, exania, or a prolapse of the inner membrane of the rectum, will often occur on the slightest dejective effort: but if, at the same time, the rectum be labouring under any morbid irritability from the stimulus of scybulous feces, ascarides, or purgatives, the protrusion will be greatly exacerbated, a much larger portion of the gut will be exposed, and its retrocession will be more difficult. Sometimes, indeed, the

α P. Exania
atonica.
Cause of
this variety.

The pro-
lapse some-
times very
extensive.

* See Calvert's Practical Treatise on Hemorrhoids, &c. 8vo. Lond. 1824.

GEN. XII.
SPEC. V.
Proctica
Exania.

portion exposed has been very considerable; for Morgagni relates a case, in which the valvulæ of the colon were hereby brought into view*; and Hagen† another, in which there was a prolapse of the entire colon itself.

β P. Exania
spasmodica.
How pro-
duced.

Common, however, as is the disease before us from local or general debility, it is perhaps still more frequent from that habitual or accidental excess of contractile action in the sphincter of the anus.‡ If the tumour remain down, it becomes large, irritable, and painful; and, if assistance be not obtained soon, a violent and serious inflammation will be sure to supervene.

A return
easily
effected in
atonic pro-
lapses.

In the atonic prolapse, but little aid is necessary, in ordinary cases, to return the protruded part. A simple pressure of the hand against the denuded part of the intestines, or sitting upon a plain and hard seat, will ordinarily be sufficient; and, if not, an introduction of the fore-finger up the anus will always succeed. Hence patients, labouring under this variety, commonly return the gut themselves after evacuation; and in many instances it will ascend of its own accord.

But a radi-
cal cure
difficult.

The chief difficulty is in effecting a cure; which can only be accomplished in two ways: by invigorating and bracing the loose and relaxed membrane; or giving it an adhesion to the subjacent cellular substance from which it is detached.

Strengthen-
ing the re-
laxed mem-
brane.

The first may sometimes be accomplished by local tonics and astringents; as cold water dashed against the buttocks, injections of cold water, solutions of alum or sulphate of zinc, or an infusion of catechu or gall-nuts.

Producing
adhesion
with the
subjacent
cellular
substance.

The second can only be accomplished by artificially exciting a slight continuous inflammation in the cellular substance, by slipping off a small piece of the protruded membrane, as recommended by Mr. Hey; or passing a ligature through a small portion of it, and letting it remain after the return of the membrane, till the inflammatory action has commenced; by which means a radical cure is often obtained, in the same manner as a like cure is effected in scrotal dropsy, by hooking forwards and cutting off a small piece of the tunica vaginalis after evacuating the water. Mr. Copeland has employed this method in various instances, and with all desirable success.

Prolapse of
the upper
part of the
rectum.

Where there is a prolapse of the upper part of the rectum, or of the colon, the disease is of a different kind; for, in this case, the entire parietes descend, and the upper part is invaginated in the lower, as in an intussusception of the smaller intestines; but with less mischief in the present instance, as there is more space for play, and as the intestinal canal evinces less sensibility, and consequently admits of harsher treatment, in its progress towards its

* De Sedibus, &c. xxxiii. lxxv. 6.

† In Schroeder Verm. Schr. band i. p. 609. 1778.

‡ The correctness of this explanation may be doubted: the case here described, probably, does not arise from excessive action of the sphincter, but rather from a bad habit of sitting long at stool, and from the protracted efforts of straining, in which many muscles tend to propel the rectum and its contents downwards, the sphincter and cellular connections of the gut becoming thereby in time so weakened, that a prolapsus ensues. In the production of the first variety described by the author, spasm of muscles has a share, particularly when there is irritation about the rectum from piles, or other cause; though, of course, the repeated protrusions will naturally, at last, weaken the sphincter. — ED.

lower extremity. In this case, the whole we can aim at is to strengthen the fibres of the relaxed bowel, and restore them to a healthy elasticity by the use of tonic and astringent injections.

In entonic or spasmodic exania, it will be often necessary to apply leeches, and to bleed pretty freely, before a reduction can be obtained. After which, as this is chiefly a result of spasmodic stricture, or depends upon like causes, the mode of treatment already recommended for the one will be the best plan to be pursued for the other.

This complaint is also found occasionally as an effect in lithiasis, proctica marisca, helminthia podicis, scirrhus of the prostate gland, fistula ani, and other affections of the uterus, vagina, bladder, and neighbouring organs.

GEN. XII.
SPEC. V.
Proctica
Exania.

Leeches
often neces-
sary in the
second
variety.

Found as a
sequel or
effect of
other dis-
eases.

CLASS I.

CŒLIACA.

ORDER II.

SPLANCHNICA.

DISEASES AFFECTING THE COLLATITIOUS VISCERA.

DISQUIET OR DISEASED ACTION IN THE ORGANS AUXILIARY TO
THE DIGESTIVE PROCESS, WITHOUT PRIMARY INFLAMMATION.

CLASS I.
ORDER II.
Splanchnica, its
various
senses.

Its mean-
ing in the
present ar-
rangement.

Organs
included
under it.

THE order of diseases, upon which we now enter, is in the present classification denominated SPLANCHNICA (ΣΠΛΑΓΧΝΙΚΑ), as primarily affecting, and being seated in, the viscera that are directly adjuvant to the function of digestion. The term SPLANCHNICA is thus reduced to its more limited and emphatic sense: for, in a loose and broader signification, it imports, like its Latin synonym *viscera*, all the larger bowels or internal organs, to whatever cavity they appertain, and consequently includes the brain: but in its stricter and more exact meaning, it was formerly confined to those of the upper and lower belly, comprising what we colloquially call the ENTRAILS; and more especially those which were consulted by the aruspices, and constituted the chief parts of the sacrifice: in which sense it is mostly employed by Homer, and the Greek tragedians.

The organs, therefore, to which the term is here intended to be applied (for the alvine canal forms the subject of the first order), are the liver, spleen, pancreas, mesentery, and omentum; and as, in the physiological proem to the class before us, we took a general survey of the structure of these organs; and, so far as we are acquainted with them, of the parts they respectively fulfil in accomplishing the economy of digestion; we shall proceed, without farther delay, to a consideration of the diseases which belong to them under the proposed arrangement.

The order embraces four genera:

- | | |
|-------------------|-----------------------|
| I. ICTERUS. | YELLOW JAUNDICE. |
| II. MELÆNA. | BLACK JAUNDICE. |
| III. CHOLOLITHUS. | GALL-STONE. |
| IV. PARABYSMA. | VISCERAL TURGESCENCE. |

Of these, several comprise numerous species, which will be noticed in their respective places.

GENUS I.

ICTERUS.

YELLOW JAUNDICE.

YELLOWNESS OF THE EYES AND SKIN; WHITE FECES; URINE
SAFFRON-COLOURED, AND COMMUNICATING A SAFFRON DYE;
THE COURSE OF THE BILE OBSTRUCTED.

THIS disorder was by the Greeks denominated ICTERUS (ΙΚΤΕΡΟΣ) as above, and by the Romans, as Celsus particularly notices, Morbus arquatus, or Morbus regius: but on what account either of these names has been given to it, we have no satisfactory information. Arquus means a rainbow, which requires more explanation than has hitherto been given; and the meaning of regius, as expounded by Celsus, will, I apprehend, content very few. "Its cure," says he, "is to be attempted by exertions of every kind, luso, joco, ludis, lascivia, per quæ mens exhilaretur; OB QUÆ REGIUS MORBUS DICTUS VIDETUR*:" — 'by play, jests, sports, and dalliance, on which account it seems to be called Morbus regius, or the royal disease.' It has also been named by many writers, ancient as well as modern, *Aurigo*, evidently from its golden hue. But, of the origin or meaning of icterus, we are left altogether in the dark by the critics and lexicographers. It appears to the present author, however, probable, if he may venture upon a subject which has hitherto been tried in vain, that all these terms are expressive of a common idea; and, though not derived from a common root, are employed as equivalents to express its meaning. Icterus (ἰκτερός), as it seems to him, is the Hebrew term כתר with a formative י producing יכתר or "icter," and importing, as a verb, "to surround, circumfuse, encompass;" and, as a noun, "a royal crown, or golden diadem." Icterus was a term also given to the golden thrush or golden pheasant, on account of its golden plumage: and hence the bird was fabled to be connected with the disease; and it was believed, according to Pliny, that if a person labouring under the jaundice should look at the pheasant, the bird would die, and the patient recover. Regius, arquatus, aurigo, are not indeed univocals, but very clearly equivalents, and equally import gold, golden crown, golden bow, or circumfusion; the colour of the disease, and its encompassing the body. There are other diseases, however, that produce, or are accompanied with, a yellow tinge of the surface, as well as jaundice; as aurigo†, and sometimes porphyra or scurvy. Frank mentions a case of the latter, in which there was an intense yellowness of the whole skin, chiefly proceeding from broad maculæ, even to the palms of the hands and soles of the feet.‡ But, in all these cases, the albuginea is little or not at all affected, and the urine does not communicate the saffron dye of jaundice.

GEN. I.

How named by the Greeks and Romans; from uncertain etymologies.

Probable origin of both the Greek and Roman names.

Other diseases also marked by a yellow tinge of the surface.

* Medicin., lib. iii. sect. xxiv.

† Class vi. Ord. III. Gen. x. Spec. iv.

‡ De Cur. Hom. Morb. Epit., tom. vi. lib. 6.

GEN. I.
Icterus.
What the
use of the
bile ;

or of the
liver.

The liver
found in
animals of
almost
every rank ;
and bile
secreted
even where
no liver is
discover-
able.

Gall-
bladder
wanting in
many qua-
drupeds.
Rule under
which it
may be
expected.

Case of an
infant in
which it
was not
found.

Perhaps no
bile ante-
cedently to
birth.

There is, however, a far more important enquiry immediately connected with this subject, which I am afraid will be still less easily settled. We are sufficiently acquainted with the seat of jaundice, which is the liver, and of its proximate cause, which consists in an impeded flow of the bile ; but who shall explain to us the real use of the bile, or even the final use of the liver, that secretes it? Considering the large size of the liver in all animals that possess it, and, at the same time, how generally it is possessed, being, to all red-blooded animals, as common as the heart itself, there can be no doubt, that it is of great importance in the animal economy, notwithstanding our uncertainty of the part it performs.

Even below the rank of red-blooded animals, we often discover it, and of great extent ; as in the snail, oyster, and muscle ; and frequently, too, where we cannot trace an organ answerable in structure and appearance to the liver, we are obliged to admit the existence of an organ that supplies its place ; for there are many insects, as the larvæ of the *cynips querci*, or gall-fly, and that of the *curculio nucis*, or nut-weevil, that secrete bile in such quantity as to tinge with a brownish yellow the tender branch, nut, or other substance in which they find a habitation, and to give it a taste as bitter as ox-gall.

The direct and obvious office of the liver is the secretion of bile, which, in most animals, is suffered to accumulate in a pear-shaped reservoir, adhering to its concave surface, and denominated a gall-bladder. Yet, in many animals, even of different classes, we perceive no such reservoir, as the elephant, rhinoceros, stag, camel, goat, horse, tricheus, porpoise, rat, ostrich, and parrot : while we do not know of a reptile that is destitute of it. Upon the whole, however, it may be observed, that a gall-bladder is common to all carnivorous animals possessing a liver, and that it seems to be only wanting in those that feed on vegetables alone. Yet, while we see the distinction, we are ignorant of its cause, and incapable of applying it. In the human subject, it has sometimes also been wanting*, of which Dr. Cholmeley gives an example† : but such a deficiency has mostly occurred in infants who have perished soon after birth ; before which period, as there is no transit of feces through the intestinal canal, and perhaps no peristaltic action, it does not appear to be necessary. Perhaps, indeed, antecedently to birth there is no bile secreted. In the case related by Dr. Cholmeley, although the whole of the bile, as fast as it was secreted, seems to have been carried back into the system, the sallowness of the skin is not noticed to have occurred till the day after birth ; from which time the child exhibited a deeper and deeper hue, till it died of convulsions at the end of five weeks.

[The want of a gall-bladder does not always dangerously impair the health ‡ ; and an example in which a person, with such malformation, reached the adult state, has been lately recorded.§ Cats bear the removal of the gall-bladder without fatal consequences. ||]

* Olivier, note sur l'atrophie de la vésicule biliaire, in Archiv. Gén. de Méd. tom. v. p. 196.

† Med. Trans., vol. vi. art. 4.

‡ Meckel, Manuel d'Anatomie, tom. iii. p. 468.

§ Mém. de Méd. Militaire, tom. xx. p. 406.

|| Sir E. Home. Phil. Trans., 1813, part ii.

It was stated in the physiological proem, that one supposed use of the bile is, to maintain the peristaltic action of the bowels. Yet Sir Everard Home* has given an example of a child that fed heartily, seemed to digest its food well, and had regular stools, and was nevertheless without a gall-bladder, or even a duct of any kind leading from the liver to the duodenum.†

There are also a few other circumstances relating to the bile, that yet stand in need of explanation. The hepatic bile, or that secreted into the hepatic duct, is mild and sweet; the bile found in the gall-bladder is pungent and bitter; whence we might infer, that it is the gall-bladder that secretes the bitter principle. Yet, in children, the gall-bladder bile is as sweet as that of the hepatic duct; and in various insects, as we have already seen, a bile powerfully bitter is secreted without either gall-bladder or liver. Who shall develop the cause of these discrepancies? Who shall unfold to us the use of the bitter principle of the bile, or explain why it is necessary to the animal economy in an adult state, and not necessary in a state of infancy?

Yet, whatever be the use of the bile, or the office of the liver, we know that the general symptoms of jaundice depend upon an obstruction to the flow of the bile into the alvine canal, and its retrograde passage into the blood. [Thus, in animals, jaundice may be produced by applying a ligature to the ductus choledochus; and, in the human subject, dissection has frequently proved its origin from the direct or indirect pressure of various swellings and indurations, either of the pancreas, stomach, spleen, omentum, and other organs, against the biliary ducts. The jaundice, occasionally arising in pregnancy, is sometimes ascribed to the pressure of the gravid uterus on the same canal, and sometimes to a plethoric state of the system, and of the liver in particular, in consequence of the suppression of the menses, which last opinion was espoused by Sauvages, Portal, and Powell. Dr. Elliotson has frequently seen jaundice in pregnancy; not, however, as the result of pregnancy, but of inflammation of the liver, and which subsided under the treatment for common inflammation, while the preg-

GEN. I.

Icterus.

Whether the bile acts as an irritant upon the intestines.

Not always necessary to digestion.

Difference between hepatic and cystic bile.

Why this difference?

Obstructed flow of bile the cause of jaundice.

* Phil. Trans., 1813, pp. 156, 157.

† The daily escape of a considerable quantity of bile through a fistulous opening in the parietes of the abdomen, has occurred without serious impairment of the appetite, the digestion, or the health in general. This is a curious fact, and deserves to be well considered in every physiological view of the hepatic system. Dr. Abercrombie visited, along with Mr. Lizars, a man, about fifty, who had had a biliary fistula for nearly four years. The complaint began with pain in the region of the liver, accompanied by vomiting and jaundice. After these symptoms had continued about three weeks, a tumour formed in the region of the gall-bladder, which was opened, and discharged much fluid of a mixed green and yellow colour, and some small biliary calculi. This opening closed, but another soon took place, which has continued to discharge ever since. The discharge varies in quantity, but is often so profuse as in a very short time to wet the patient's clothes as far as his knee, and, in the night, to soak through his bed. Mr. Lizars at one time collected, in the course of fifteen or twenty minutes, about four ounces of a fluid, which, on chemical examination, exhibited all the properties of pure bile. The man has every appearance of good health, and, except the fistulous opening, there is no appearance of disease in the region of the liver. His appetite and digestion are good, and the evacuations of a natural appearance. See Abercrombie on Diseases of the Stomach, &c. p. 395. — ED.

GEN. I.
Icterus.

Produced
from five
distinct
sources.

nancy went on.* Whatever will produce hepatitis, or great congestion of the liver, will bring on jaundice.] It has been supposed, indeed, that the bile might, after entering into the intestines, be absorbed and carried into the blood, and by this means produce a jaundice, and a jaundiced hue, without any obstruction to its flow into the intestinal channel. But, in this case, it seems impossible that the stools should not be tinged with a yellow, instead of presenting a white hue, which is one of the common characters of the disease.† In order to constitute jaundice, there must generally, therefore, be some obstruction to the passage of the bile through its proper ducts into the intestinal canal. And this obstruction may proceed from five sources, each of which may be accompanied with peculiar symptoms, and consequently furnish us with the five following species :—

- | | |
|-----------------------|----------------------|
| 1. ICTERUS CHOLEUS. | BILIARY JAUNDICE. |
| 2. ——— CHOLOLITHICUS. | GALL-STONE JAUNDICE. |
| 3. ——— SPASMODICUS. | SPASMODIC JAUNDICE. |
| 4. ——— HEPATICUS. | HEPATIC JAUNDICE. |
| 5. ——— INFANTUM. | JAUNDICE OF INFANTS. |

The disease is also found symptomatically in pregnancy, colic, and fevers of various kinds; especially *epanetus icterodes*, or yellow fever.‡ [It is generally a sporadical complaint, but instances of its being epidemic, particularly at the termination of campaigns, in wet autumnal seasons, and also of its being endemic, are recorded.§ The disease appears to have been epidemic at Cronstadt in 1784 and 1785, and at Geneva in 1814. In the latter city, it occurred after the hot weather of summer, being in some cases combined with a bilious fever; in others, not associated with any other manifest disorder.|| Persons, who have been in warm climates, are more predisposed to the disease than others.]

* Lectures at London University. See Med. Gazette for 1832–3, p. 488.

† Exceptions are occasionally met with, in which the feces are not white. Bile passes into the intestines; but so much is secreted, that all does not escape, and a portion goes into the circulation. It is conceivable, then, that jaundice may arise from an excess of bile. This view, however, is sometimes regarded as hypothetical: thus, Dr. Abercrombie does not place confidence in morbid viscosity of the bile, spasm of the ducts, overflow of the bile, and what has been termed bilious congestion, as the causes of jaundice. See Pathol. and Pract. Researches on Diseases of the Stomach, &c. p. 394. ed. 2.

‡ The colour of the skin, in yellow fever, is not always regarded as the effect of jaundice. “The yellowness in this case is not universal; it occurs particularly about the neck; and it appears rather to arise from a disordered state of the blood, or an altered condition of the blood, as to some of its constituents, exactly as we see it in bruises.” See Professor Elliotson’s Lectures, Med. Gaz. for 1832–3, p. 487.

§ See Monro on the Health of Soldiers, 2 vols. 8vo. 1780. Pringle on Diseases of the Army. Edin. 1810. Alibert, Nosologie Naturelle, &c. 4to. Paris, 1817, &c.

|| See Dict. des Sciences Méd., tom. xxiii. p. 414.

SPECIES I.

ICTERUS CHOLÆUS.

BILIARY JAUNDICE.

THE COURSE OF THE BILE OBSTRUCTED; GENERAL LANGUOR;
NAUSEA; DYSPEPSY; AND OCCASIONAL PAIN OR UNEASINESS
AT THE STOMACH.

THE specific term cholæus (χολαῖος) is here restored from the Greek writers, among whom it has been common from the time of Hippocrates.

GEN. I.
SPEC. I.

Dr. Cullen has not noticed this species: but it occurs in Bonet, Amatus Lusitanus, Forestus, Sauvages, and most of the later writers. It is easy, indeed, to conceive that bile may become inspissated from various causes, and particularly from an absorption of its aqueous or thinner parts, by the lymphatics of the ducts themselves, or of the gall-bladder; from an augmented secretion of the albumen, or, as Berzelius considers it, the mucus of the gall-bladder dissolved in the bile; and from too viscid a texture of the bile, in its secretion in the liver. And, in effect, there are few observant practitioners but must have remarked, that the evacuations, whether by the mouth or the anus, when the obstruction is just removed, consist at times of nearly pure bile, peculiarly tenacious and high-coloured.

Species not noticed by Dr. Cullen, but by various others. Bile may be inspissated from various causes.

[After the bile is secreted, if the hepatic, or the common duct, be obstructed, so that the passage of this fluid into the duodenum be prevented, it regurgitates into the liver, and is taken up by the absorbent vessels, and carried into the mass of the circulating blood*, in the serum of which it becomes dissolved, and thus gives it its own yellow colour. The blood, thus tinged, carries the dye with it to every part of the body, and hence the general hue of jaundice is produced. It would seem, however, that the bile, in a liver, distended from obstruction of the ducts, is not only taken up by the absorbents, but is also forced into the mouths of the hepatic veins. In dissections, Dr. Saunders and Dr. Powell both noticed bile in the thoracic duct, and the first of these

Bile absorbed into the blood.

* The actual presence of bile in the blood of jaundiced persons is denied by M. Deyeux (*Considérations Chimiques et Médicales sur le Sang des Ictériques*, 4to. Paris, 1809); and doubted even by M. Thénard. On the contrary, the researches of M. Clarion (*Journ. de Méd.* an 13.), Orfila (*Elém. de Chim. Méd.*), Saunders, Alibert (*Nosol. Naturelle*, 1817), and others, tend to prove the correctness of the belief, as ancient as Hippocrates, that the bile passes into the circulation. John Hunter supposed that the mixture of bile with the blood would make it coagulate; but it is known, that a quantity, sufficient to give a yellow tinge to the serum, does not have the effect in question. We know that the serous secretions assume a remarkable yellowness. If a person labouring under jaundice is blistered, the fluid from the blister is yellow, and the serous fluids within the body are of the same colour. Dr. Cheyne related to Dr. Marsh the case of a lady, affected with jaundice, whose linen was rendered quite yellow by the exhalation from her skin. — ED.

GEN. I.
SPEC. I.
Icterus
cholæus.

physicians found the serum of the hepatic veins in a dog, in which jaundice had been a short time before produced by a ligature on the common biliary duct,* evidently more loaded with the colouring part of the bile, than the serum in other veins.* When the bile reaches the circulation, the intensity of tinge, which different parts receive, will be in proportion to their vascularity, and the quantity of colouring matter thus carried to them; or to the natural hue of the part being more or less calculated to show it, as in the eye, and white of the nails.]

Found
most fre-
quently in
the autumn.
How com-
mences.
Progressive
symptoms.

This species is found most generally in the autumn. In many instances, it commences slowly and insidiously; there is felt a general restlessness, diminution of appetite, disturbed sleep at night, and disinclination for exertion of any kind: the urine is of a deep yellow, and deposits, perhaps, a pitchy sediment; the bowels grow sluggish, the dejections are clay-coloured, or whitish, and have not the usual feculent smell. In some examples, however, the bowels are loose. The eyes and surface of the body look yellower than usual, and there is a very troublesome itching of the skin. In this species, however, there is little or no pain in the right hypochondrium, and little or no sickness at the stomach, though a frequent sense of nausea.

Parts in
which the
yellowness
first shows
itself.

[In all cases of jaundice, except such as are very suddenly produced by the bites of venomous animals, and other particular causes, the yellowness commonly first shows itself about the inner angles of the eyes, the white of which is tarnished in a very early stage; but the whole cornea soon becomes manifestly yellow. On the temples, light yellow patches are next seen, which daily assume a deeper and deeper tinge. Similar yellow discolorations then appear on the face, neck, and breast, and all at length spread and unite, so as to cause an universal tinge. Yellow semicircles at the roots of the nails make their appearance very early. It is a curious circumstance, however, in the history of jaundice, that the yellow dye of the skin should generally first show itself on the upper parts of the body, which are likewise the first to resume their natural colour.]

State of the
tongue.
Bitter taste
in the
mouth.
Pulse.

The tongue, palate, and teeth, have a yellow coating, which cannot be washed away. Whatever the patient puts into his mouth frequently has a bitter taste; and, indeed, the bitterness in the mouth is very annoying, even not at meal-times. A partial-ity to acids and sourish food is also generally experienced.

In this affection, the pulse is ordinarily feeble. In the beginning, however, particularly if there be any pain in the hypochondrium, it is hard, and even frequent and full. But, after the pain subsides, the pulse has been known to sink to only thirty strokes in a minute, some examples of which are reported by M. Andrée.†]

* See Saunders on the Structure, Economy, and Diseases of the Liver; Powell's Obs. on the Bile, p. 56.; Bateman in Rees's Cyclopædia, art. JAUNDICE. Where the presence of the yellow matter of the bile in most of the solids and fluids constitutes this disease, we are not to imagine, that an impediment to the transmission of bile through the biliary ducts into the duodenum always exists. In numerous persons, who died of or with jaundice, those ducts have been found perfectly free. Andral, Précis d'Anat. Pathol., tom. ii. p. 616., and Clinique Médicale.

† See Dict. des Sciences Méd., tom. xxiii. p. 408.

In an early stage of the disease, free vomiting is of essential service. During this action, the diaphragm and abdominal muscles contract concurrently; and the whole of the viscera of the abdomen are forcibly pressed upon. Such a pressure must necessarily, therefore, affect the gall-bladder and biliary ducts, and oblige them to pour out their contents very freely; nor is there a more powerful mean in our possession of unloading the liver of any viscous or stagnant fluid, or of restoring and invigorating its circulation. For this purpose, the antimonial emetics are preferable to those of ipecacuan. They are less readily rejected, and excite a stronger stimulus from the first; and hence the vomitings they produce will continue for a longer period of time. To these should succeed a brisk purgative or two, with a copious use of diluting, sub-acid drinks, which, in ordinary cases, will easily remove every symptom. But if the disorder, from the obscurity of its march, be not soon suspected, the impeded passages will become more obstinately obstructed, the gall-bladder and bile-ducts will be distended; there will be a general feeling of fulness in the right side, with great irritation and fever; which last will often continue for a week or a fortnight after the obstructing cause has been removed.

Where the substance of the liver has been free, and the ducts alone obstructed, the quantity of bile that has accumulated in the gall-bladder has sometimes been enormous. In one instance, which terminated fatally, this reservoir was found, after death, to be so considerably dilated, as to be loaded with not less than two Scotch pints, or eight pounds, of this fluid.* [Whether this case ought to be received as a confirmation of the statements of Galen, Darwin, and Powell, that jaundice is sometimes the result of paralysis of the gall-bladder, from immoderate distention of it, is a question not easily solved.] There is often a paresis or hebetude of action in the bile-ducts themselves; and where we have reason to suspect this, it will be most effectually relieved by the blue-pill, or small doses of calomel, or Plummer's pill, which is better than either, continued for two or three weeks at a time. If the liver partake of this torpidity, and no acute symptoms occur, the disease is apt to run into the fourth species, and must be treated accordingly.†

GEN. I.
SPEC. I.
Icterus
cholæus.
Medical
treatment.
Free
vomiting;

with anti-
monial
emetics.

Brisk
purgatives,

Effects
when
chronic.

Accumula-
tion of bile
in the gall-
bladder
sometimes
enormous.

* Edin. Med. Essays, vol. ii. art. xxx.

† In the treatment of jaundice, Dr. Elliotson very judiciously recommends us first to consider whether any inflammation exist; whether the case is one of hepatitis; and, if it be, then it is to be treated on principles applicable to the latter disease. He coincides with many other practitioners in considering mercurial purgatives more efficacious in jaundice than any others. (See Med. Gaz. for 1832-3, p. 489.) When jaundice appears to be connected with any affection of the liver of an inflammatory character, Dr. Abercrombie, after subduing the activity of the symptoms by local and general bleeding, blistering, low regimen, and free and continued purging, recommends mercurial friction, and friction with iodine. Pathol. and Pract. Researches on the Diseases of the Stomach, &c. p. 399. — ED.

SPECIES II.

ICTERUS CHOLOLITHICUS.

GALL-STONE JAUNDICE.

THE COURSE OF BILE OBSTRUCTED BY BILIOUS CONCRETIONS IN THE DUCTS, WHICH ARE AT LENGTH PROTRUDED AND DISCHARGED WITH THE FECES; FREQUENT RETCHING; ACUTE PAIN IN THE HYPOGASTRIC REGION, INCREASED UPON EATING.

GEN. I.
SPEC. II.
Closely
connected
with gall-
stone, or
chololithus.
Line of
distinction.

THIS species is the *icterus calculosus* of most of the Nosologists. It is so closely connected with the genus CHOLOLITHUS, or GALL-STONE, forming the third in the present order, in its general origin, symptoms, and mode of treatment, that the reader may be referred for almost all these to the latter. Yet it is necessary to give the two affections distinct places: for the yellow dye of the skin and urine, which forms a pathognomonic symptom in icterus, occurs often, as we have already seen, without chololithus, even in its passing species and acute state, and very generally in its quiescent state. The liver itself is, in many cases, sound*: but it is often connected with a morbid condition of this organ, and proceeds, perhaps, in some instances, from a morbid secretion of bile, by which it becomes more disposed to crystallize. Dissection has shown, that the seat of obstruction is most frequently in the cystic duct; next in the ductus choledochus; and then in the hepatic.† The rest will be explained under the genus CHOLOLITHUS.

* Heberden, Med. Trans. vol. ii. p. 124.

† Jaundice takes place from the presence of a gall-stone in the biliary ducts, when the calculus is a considerable time in passing, so as to produce an obstruction of some continuance in the duct: when it passes in a shorter time, though the symptoms may be equally severe, no jaundice follows. (See Abercrombie on Diseases of the Stomach, the Intestinal Canal, the Liver, &c., p. 394. ed. 2.) "It has been disputed," says this able physician, "whether biliary calculi are ever formed in the substance of the liver, or in the gall-bladder only. But Morgagni mentions several instances in which they were found in the liver, and even of great size; and, therefore, there is no doubt of another point, which has been disputed, namely, that they may produce jaundice by sticking in the hepatic duct." Op. cit. p. 396. — Ed.

SPECIES III.

ICTERUS SPASMODICUS.

SPASMODIC JAUNDICE.

THE COURSE OF THE BILE OBSTRUCTED BY A SPASMODIC CONTRACTION IN THE COURSE OF THE BILE-DUCTS; THE DISEASE COMMONLY PRECEDED BY ACRIMONIOUS INGESTA, HYSTERIA, OR SOME VIOLENT PASSION OF THE MIND; AND SPONTANEOUSLY SUBSIDING WITHIN A FEW DAYS AFTER THESE ARE REMOVED.

THE general symptoms of this affection are those of the preceding species, or of *chololithus means*, which so closely agree with the preceding: but the causes and mode of treatment are different; and it is necessary to attend to their specific signs, in order that they may be distinguished.

Spasmodic jaundice occurs for the most part in those of irritable habits, or whose liver, from a long residence in hot climates, from an undue indulgence in spirituous potations, or high-seasoned dishes, or from any other cause, is in a state of chronic irritability. So far as I have observed, it occurs more frequently in women than in men, probably from their passing a more sedentary life, and chiefly after menstruation has ceased, and the general form assumes a more corpulent shape.

There is also very commonly, in those who are subject to it, a sallowness of the skin, indicative of irritability and increased action of the liver, and of a larger regurgitation of bile into the blood-vessels than is necessary for the purpose of health. Dr. Heberden has observed that the liver is sometimes perfectly sound; and there is no doubt that this is a fact; for the irritability may originate in, and be confined to, the ducts; but it more generally commences in the liver itself, and is hence extended to the ducts, which, from their structure, are far more irritable, as well as more sensible, than the parenchyma, or general substance of the liver, and consequently far more susceptible of pain and spasmodic contraction.

[Spasm of the common duct is particularly mentioned by Dr. Cullen among the causes of jaundice, and Dr. Powell deems the fact well established, although it has often been denied. Andral enumerates four principal causes of the complete or incomplete, temporary or permanent, obstruction of the biliary passages, viz. the lodgment of a foreign body in them; their compression by membranous adhesions, or some kind of tumour; their spasmodic contraction; and the thickening of their mucous membrane from inflammation.* Jourdan and Breschet, however, express their suspicions, that the latter state also prevails in every instance reported to be spasmodic.† Jaundice frequently accompanies spas-

GEN. I.
SPEC. III.

Resembles the preceding in symptoms, but not in mode of cure.

Pathology.

* Arch. Gén. de Méd. tom. vi. p. 16.

† Manuel d'Anat., par J. J. Meckel, tom. iii. note, p. 469.

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.

modic diseases. Thus it is said by Sydenham to come on during hysterics, a circumstance which the editor has never seen, and which is denied by Dr. Heberden. According to Dr. Saunders, anger not only augments the quantity of bile, but likewise vitiates it. Hence, flowing into the duodenum in large quantities, and regurgitating into the stomach, it produces the same effects as an emetic; and hence, probably, the term *choleric*, as applied to passionate people. If the ductus communis should not transmit it as fast as it is secreted, and the gall-bladder be already full, then it will return towards the liver, and, by entering the blood-vessels, produce jaundice.* Dr. Bateman regarded this as the most probable explanation of the influence of the passions in producing a temporary jaundice, and of course he did not put much faith in the doctrine of spasm.† Among the less common causes of jaundice, a thickening of the biliary ducts is mentioned by Morgagni, who records a case of a total obliteration of the common duct.‡]

Causes.

Sympa-
thetic action
of the liver
with other
parts.

The primary cause of this disease we cannot always trace; but it is easily reproduced in those, who are subject to it, by flatulent, acrimonious, or indigestible food, or by violent mental emotion. It is often also reproduced, or even primarily excited, by cold in the feet, drinking cold water when the body is greatly heated, and a transfer of atonic gout from the extremities to the stomach, or any part of the intestinal canal. We have hence a clear proof of the strong sympathetic connection which exists between the liver and various parts of the body. [The jaundice sometimes produced by corporeal suffering, irritation in the alimentary canal, and the bites of venomous animals, is referred by Hoffmann, Mead, and Bosquillon, to the spasmodic species.] An affection of the brain will also often produce jaundice§; and hence a frequent exciting cause is a sudden and violent burst of the depressing passions, as terror, jealousy, and despondency. It is, indeed, most probable, that the torpidity induced directly in the organ of the liver, from the exhausting heat of tropical climates, is also greatly augmented by the operation of the same cause on the skin, and the sympathy of the liver with this organ.

Descrip-
tion.

The disease is ushered in by a sense of fulness at the stomach, accompanied with great languor and nausea; a violent pain at the pit of the stomach soon succeeds, with an almost incessant sickness, and an utter inability of retaining either food or medicine of any kind. The pain grows intolerable, and shoots towards the left shoulder, or spreads round the loins, and girds them as with a cord. The epigastric region is greatly distended, and cannot endure the pressure of the hand; while the pulse exhibits little variation.

* Saunders, p. 235.

† Rees's Cyclopædia, art. JAUNDICE. Dr. Abercrombie doubts the truth of the doctrine of spasm of the biliary ducts, as a cause of icterus (on Dis. of Stomach, pp. 394. and 400.); and Dr. Burder is of opinion, that we have no evidence of its existence. (Cyclop. of Pract. Med. art. JAUNDICE, note, p. 5.) The two following cases are quoted by Dr. Abercrombie, as proving clearly the origin of jaundice from passions of the mind: a woman, mentioned by Hoffmann, was affected with jaundice every time that her mind was agitated; and a medical gentleman, spoken of by Mr. Cooke (on Derangements of the Digestive Organs), became jaundiced almost invariably when he had a dangerous case under his care. — Ed.

‡ De Causis et Sedibus Morb. Epist. 37. art. 10.

§ Cases of Jaundice, &c. by Henry Marsh, M.D. Dublin Reports, vol. iii.

The bowels are for the most part costive, and moved with difficulty. [The stools are scanty, of a greyish, or clay colour, and, as long as the urine is of a deep yellow or saffron colour, voided with difficulty. But, when this secretion becomes paler, they assume their natural yellowness again, are more copious, and the patient begins once more to be conscious of the sensation preceding or accompanying their natural expulsion; a sensation, that is lost while the bile continues to tinge the urine in a considerable degree. It should be understood, however, that costiveness does not always precede, or attend the first symptoms of jaundice; but as Monro, Pringle, and Powell attest, there is sometimes a considerable looseness, with greyish stools of a faint, or rather sour smell. At first the urine is yellow and quite limpid; but it afterwards becomes frothy, saffron-coloured, reddish, and very thick; sometimes almost black, depositing a sediment like brick-dust, or dark blood. In proportion as the yellowness of the skin fades, the urine loses its saffron colour, and becomes clear again.] This colour shows itself the sooner in proportion to the violence of the other symptoms, and especially of the retching; and the surface of the body, and especially the fine sclerotic coat of the eye, assume the same livery. And if the disease become chronic, the yellow dye is not confined to the skin, or even to the fluids, but pervades every part of the body, the most compact as well as the most porous; so that the pericardium, the heart, the peritoneum, the meninges, the substance of the brain, the cartilages, and even the bones, are clothed with the common colour. Stoll*, Lieutaud†, Bartholin‡, and Morgagni§, give various examples of this; though the last observes, that a yellow tinge of the brain is a rare occurrence.

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.

Yellow
tinge uni-
versal.

One of the latest fluids that becomes tinctured is the milk in icteric wet-nurses; probably in consequence of its rapid passage and elaboration from the fluids introduced into the stomach. Dr. Heberden has remarked, that, in wet-nurses, the milk is never tainted with the bile either in taste or colour; but this assertion is too general, and at variance with the observations of other pathologists. Reidlin lays down the fact more correctly, in affirming that all the humours are *sometimes* coloured yellow.|| And hence, indeed, the only reason we can assign for the bilious and bitter taste that is often present in the stomach, insomuch that every thing the patient eats or drinks partakes of this quality: while the common bile-duct is locked firm, the intestines are without bile, and the stools are whitish or clay-coloured. The fact is, that the whole mass of blood is so impregnated with bile, that the saliva, and all the other lubricating secretions of the mouth, fauces, and œsophagus, and probably the gastric and pancreatic juices, are loaded with the same material, so that the sense of taste cannot be otherwise than affected.

Milk affect-
ed latest.

Why a
bitter taste
in the
mouth.

* Rat. Med. part iii. p. 386. et passim.

† Hist. Anat. p. 190.

‡ Epist. iii. p. 419.

§ De Sed. et Caus. Morb. epist. xxxvii. art. 7.

|| Lin. Med. 1697. Febr. Obs. 7. In examining the body of a woman, who died in the Lock Hospital of Dublin, from protracted disease, connected with jaundice, Dr. Morris found the mammæ full; and, by moderate pressure, several ounces of a yellow tenacious fluid, having all the visible properties of pure bile, were discharged from them. — Ed.

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.
Whether
objects ap-
pear yellow.

The jaundiced have, from a very early period, been said to see all objects of a yellow hue, as they appear to us when looking through a yellow object-glass; from which we may judge, that the humours of the eye, like the other fluids of the body, are also tinged, as Celsus observes*, with the resorbed bile, and communicate the tinge to the picture thrown upon the retina. Lucretius, so far as I know, is the earliest writer, of those that have descended to our own day, who has made this remark, which he introduces as illustrative of another subject, and appeals to as a familiar fact: —

*Lurida præterea fiunt, quæquomque tuentur
Arquatei; quia luroris de corpore eorum
Semina multa fluunt, simulacris obvia rerum;
Multaque sunt oculis in eorum denique mixta,
Quæ contage suâ palloribus omnia pingunt.†*

The jaundiced, thus, see all things round them clad
In yellow; every object as it flows
Meeting new tides of yellow, from their forms
Thrown forth incessant; and the lurid eye,
Deep, too, imbued with its contagious hue,
Painting each image that its orb assails.

Discredited
by Heber-
den and
Frank.

Author's
own case.

Circum-
stances ne-
cessary to
this effect.

Dr. Heberden, however, affirms, that all the jaundiced patients he has at any time attended have contradicted this opinion, with the exception of two females, whose testimony he is disposed to hold lightly; and Professor Frank is decidedly of opinion, that no such affection takes place. Yet from a single case in my own person, produced, when a student, by long-continued pressure of the epigastrium against the edge of a table in copying my short-hand minutes of medical lectures, I can confirm the general opinion: for, the first suspicion I entertained of my being affected with jaundice, was from the yellow tinge with which every object around me appeared to be arrayed. To produce this effect, however, it is necessary, as already observed, that the crystalline lens, and, perhaps, all the humours of the eye, should be tinged, and acquire the yellow hue of the sclerotic coat. This certainly does not at all times take place; and where the humours are unaffected, objects must certainly be seen in their proper colours; but where they are thus tintured, and form a yellow transparent medium, it seems difficult to conceive how a picture, transmitted through them, can avoid catching their own dye; and hence we may see why some persons, labouring under the jaundice, perceive objects coloured with yellow, and others in their proper hues.

[The statement, here made by the author, and which agrees with what Morgagni has said, relative to this curious point‡, seems to be confirmed. Dr. James noticed this disorder of vision in two old patients affected with jaundice. Hoffmann records two similar cases; and Alibert met with an additional example in a girl who was in the Hôpital St. Louis. Dr. Pemberton met with two instances, and in both the jaundice was not very intense. Dr.

* Medicin. lib. iii. sect. xxiv.

† De Rer. Nat. iv. 333.

‡ Aliquando tamen, sed rarissime, fieri potest, ut flava in hoc morbo objecta appareant, nimirum si cornea tunica bile tota saturata sit, neque tum solum, quod et Mercurialis concedit, verum etiam si quando oculorum humores summa flavedine infecti sunt.

Elliotson has also had patients similarly affected; and he remarked, that, in these examples, there was either a fulness of the vessels round the cornea, or a degree of inflammation of the conjunction present.* The rarity of this affection of vision in jaundice corresponds to, and depends upon, the rarity of the extension of the yellowness to the humours of the eye.]

I have said, that this species of jaundice, and the remark may be applied to all the species except the last, sometimes assumes a chronic form. In this case, the distressing symptoms of severe spasmodic pains, intumescence, and sickness subside; but the bile does not flow freely into its proper channel, and continues in a greater or less degree to be absorbed and carried into the circulation. The cause of this seems to be an insensibility and paresis approaching almost to a paralysis in the bilious tubes, and a chronic irritability in the hepatic absorbents. Under these circumstances, moreover, the bile that thus tardily finds its way into the duodenum must be grosser and more viscous than in a healthy state; and hence another cause of retardation and irregular supply. There is also a change in the colour, as well as in the consistency, of the bile, frequently to be met with in the chronic state of the disease; which may sometimes be the result of a morbid secretion, but is perhaps more generally that of a chemical decomposition, from the joint influence of decay and animal heat. And, under these circumstances, the bile has at different times, and in different persons, been found acid, acrid, saltish, insipid, whitish, black, green, eruginous, and versicoloured. It has been found as dense and dark as elder-rob†; as tenacious and limpid as the white of eggs‡; and as crowded and granular as the spawn of frogs.§

In this chronic form, jaundice has sometimes run on for a long period of time, occasionally for a twelvemonth. It has alternated itself with intermittents; proved a salutary crisis to fevers; or has itself been carried off by exanthems of the more violent kind; and especially by miliary and scarlet fever. The general functions, when it has assumed this form, and the constitution has become habituated to it, are sometimes so little disturbed, that we see people of the middling and lower ranks of life, who cannot afford to keep at home, and who would certainly be the worse for it if they could, going about the streets with the jaundice hue covering their hands and faces, and not prevented from engaging in any of the ordinary concerns of life in which no great degree of exertion is required.||

In the treatment of this species, emetics and cathartics, so highly beneficial in *icterus cholæus*, are of doubtful advantage. When, however, the bowels are particularly costive, or there is reason to

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.

Chronic
form of the
disease.

Changes
hereby pro-
duced in
the bile.

Often of
long con-
tinuance;

without se-
rious mis-
chief.

Therapeutic
process.

Emetics
and cathar-
tics, how
far useful.

* Lectures in Med. Gaz. for 1832-3, p. 487.

† Eph. Nat. Cur. Dec. iii. Ann. iv. Obs. 86.

‡ Stoerck, Ann. Med. i. 124.

§ Eph. Nat. Cur. Dec. ii. Ann. ix. Obs. 9.

|| All men of experience will agree with Dr. Abercrombie on this part of the subject, namely, that long-continued jaundice generally depends either upon chronic disease of the liver, or upon other diseases of neighbouring organs, compressing the biliary duct. Yet, as this judicious and correct observer has remarked, chronic disease of the liver of most extraordinary extent is sometimes unattended with jaundice. See Abercrombie on Diseases of the Stomach, &c. p. 401.

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.

Venesec-
tion.

Opium in
pills.

Blisters
mostly in-
efficacious.

Tartar
emetic
ointment.

General
regimen.

Dandelion.

suspect the lodgment of a small calculus, or of any inspissated bile in the biliary duct, purgatives are indicated in the first case; and both purgatives and emetics in the last. But, in all other examples, they must add to the disease by increasing the irritation, and should give way to blood-letting, if the patient be in vigorous health, succeeded by opiates, the warm-bath, or warm and anodyne fomentations applied to the epigastrium.* The opiate should be given in pills, for the stomach will often reject liquids of every kind. Two or three grains of the extract of opium may be tried at first, and if this be insufficient, the same or even a larger dose should be repeated half an hour afterwards, and continued till the pain abates. Blistering the seat of pain has been advised by many; and I have often tried it, but without any decided effect. If useful at all, it is rather in preventing a return of the paroxysm, than in shortening or mitigating it when present; and will hence be most advantageously resorted to in the interval.

The ointment of tartarized antimony, so warmly recommended by Dr. Jenner, has a much fairer chance of success; and, in the author's practice, has at times effected a cure where other means had been found useless. A portion of the ointment, equal in size to a hazel-nut, should be rubbed every night into the epigastric region, till the ordinary eruption appears.

The general soreness upon pressure, and the excitement of the hepatic absorbents, as already observed, continue very frequently for several weeks after the spasm itself has subsided; and, consequently, there will be great languor, indisposition to labour, and a tawny skin.

For all this, a generous diet, cheerful company, and moderate exercise, and especially riding on horseback, go very far towards effecting a cure; and perhaps farther than any course of medicine whatever. The bowels, however, must be kept open with warm aperients, and the stomach and abdominal viscera invigorated by bitter tonics.

The dandelion (*leontodon taraxacum*, Linn.) has been highly extolled by many writers of established reputation in all obstructions of the liver, and, indeed, in obstructions generally; and has been used in its roots, stalks, and leaves. All these abound with a milky, bitterish juice, which was at first supposed to be saponaceous, and hence warmly commended as a resolvent by Boerhaave. Bergius, Murray, and Dr. Pemberton have since contributed to support this character, and they are consequently in daily use even in the present day. The plant has no doubt, therefore, deobstruent virtues; but it has not fallen to my lot, though I have many times given it a fair trial, to add my suffrage in its favour. Its most obvious character is that of increasing the flow of urine.

* When jaundice is characterised more by spasmodic pain than inflammation, Dr. Elliotson deems the hot bath and opium the best means of relief. But, if the pulse be quick and strong, he recommends bleeding, as the most effectual antispasmodic that can be employed. He prefers also combining the opium with a full dose of calomel, which will prevent costiveness, and produce a free discharge from the alimentary canal. A poultice over the part, he says, is very useful. (Lect. at London University, pub. in Med. Gaz. for 1832-3, p. 489.) Dr. Good has this eminent physician with him, as a believer in the reality of spasmodic icterus. — Ed.

Soap and alkalies, however, seem to have much better pretensions to favour; and have been still more widely employed in this disease, and pretty extensively regarded as general, and hence as hepatic solvents. Yet, that they do not act as solvents in hepatic cases, is clear from a striking instance related by Dr. Heberden, who tells us, that he once attended a person, who, for a stone in the urinary bladder, had been in the habit of swallowing an ounce of soap every day for seven years. His body was opened after his death; and, notwithstanding such an extraordinary quantity of soap had been taken, a great number of stones were found in the gall-bladder, without the slightest marks of having been operated upon by any decomposing power.*

Soap, however, and other alkaline preparations may, perhaps, be useful in another respect: I mean, in becoming a substitute for the deficient bile, and cleansing the bowels by their possessing something of the same chemical properties. Yet too much stress must not be laid even upon this virtue; for large quantities of acids, as lemon-juice, have at times been taken with so much apparent benefit, as to gain, also, the credit of a cure. There is one drawback against whatever may be the remedial powers either of soap or of the alkalies; and that is, their frequent and easy decomposition in the stomach, in consequence of its containing at all times some quantity, and occasionally a very large proportion, of acidity. We may often, perhaps, introduce so much of these medicines as shall be more than sufficient to neutralize the acid; but where a large quantity is wanted for this purpose, it is better to employ the alkali alone than combined with oil, as less troublesome to the stomach. And where this is done, the best, because the most manageable, preparation of the alkalies, will be that which is the purest and most concentrated, as the liquor potassæ; nor does it appear, that the other alkalies would answer better if we had forms for elaborating them in the same manner. The Cheltenham spring has unquestionably been serviceable in the relics or sequelæ of the disease, and where exercise and a tonic plan are decidedly indicated. But where we have reason to believe, that the bile is secreted in a depraved condition, and particularly where the disease is connected with a morbid state of the liver, the Bath waters, used both internally and externally at the same time, will be found more beneficial than those of Cheltenham.

Another remedy to be spoken of, which of late years has excited great attention, is the diluted aqua regia bath, invented by the late Dr. Scott. For nearly thirty years, he was in the habit of using this preparation, and had tried it in almost every variety of strength, and almost every variety of proportion, which the two acids that enter into the composition may be made to bear to each other. He commenced his experiments in India, where, on account of the greater degree of torpidity, the liver is apt to acquire than in more temperate climates, he was in the habit of forming his bath stronger, and making it deeper than he found it proper to do in our own country: and where, nearly thirty years ago, he plunged the Duke of Wellington into one up to his chin,

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.

Soap and
alkalies do
not act as
solvents;

yet useful as
substitutes
for bile;

but often
too easily
decomposed
in the sto-
mach.

Cheltenham
water.

Bath water.

Scott's
aqua regia
bath.

How em-
ployed in
India.

* Medical Transactions, vol. ii. p. 165.

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.
How in
England.

for a severe hepatic affection he was then labouring under, and thus restored him to health in a short time.

In England, it was not often that he found it necessary to raise the bath much above the knees, and frequently contented himself with a mere foot-bath or common wash-hand basin alone. In both which cases, however, the attendants on the patient should sponge him at the same time with the diluted aqua regia, over the limbs, and occasionally over the body.

Proportion
of the acids.

The aqua regia should be compounded of three parts in measure of muriatic acid and two of nitric acid; and in preparing them for use, a pint of the combined acid is to be mixed with the same measure of water. This constitutes the diluted acid, or diluted aqua regia. The acid bath is to consist of three ounces of this diluted acid to every gallon of water. It should, however, be observed by those who are inclined to form this mixture extemporaneously at their own houses, that, if either of the acids be poured immediately on the other, a large volume of very offensive gas will be disengaged; on which account, it will be better to pour them separately and slowly on their proper measure of water.

Measure of
its strength.

If the acids be of adequate strength, the mixture subdiluted for bathing will, to the taste, have the sourness of weak vinegar, and, perhaps, prick the skin slightly, and excite a peculiar rash, if very delicate, but rarely otherwise, after it has been applied to the surface for half an hour. But since these acids vary much in their degree of concentration, as distilled by different chemists, there will be some variation in their power. The strength of the bath, however, should not be much greater at any time, than the proportion here laid down; for otherwise it may excite a troublesome rash, and give a yellow hue to the nails and skin of the feet, or whatever other part is exposed to its action. A narrow tub for a knee-bath, just wide enough to hold the feet and reach the knees, should contain three gallons of the prepared bath liquor, and consequently about nine ounces in measure of the diluted aqua regia. For a foot-bath, half a gallon may be sufficient, and a common wash-hand basin may be employed as a vessel for the purpose. The feet should remain in the bath for twenty minutes or half an hour; and the legs, thighs, and abdomen be, in the mean time, frequently sponged with the same. In the winter, the water may be used warm: but this is not necessary in the summer. The bath may be employed at first daily for a fortnight or three weeks, and afterwards every other day, or only twice a week.

Has been
found use-
ful in all
cases of
morbid bile.

Dr. Scott affirms, that he has employed this process with decided advantage in almost all cases dependent on a morbid secretion of bile; whether the secretion be superabundant, defective, or depraved. He finds it often, within a few hours of the first bathing, increase the flow of bile, and meliorate its character; and, in consequence hereof, excite an expulsion of dark-coloured feces, bright-coloured bile, or bile of a brown, green, or black colour, like tar mixed with oil. He has told me also, that, when employed in the midst of a paroxysm of severe pain from spasm of the biliary ducts, or the passing of a gall-stone, he has often known it operate like a charm, and produce almost immediate ease.*

* See also Med. Chir. Trans. vol. viii.

From the rapidity, therefore, with which it acts in some cases, he is inclined to think, that it operates, not by the absorbents, but by the nerves; and has made various experiments to show, that it is the chlorine of the muriatic acid alone, by the present process decomposed and set at liberty, that produces the benefit of the bath. To prove this, he employed a bath of water saturated with chlorine, obtained from the muriatic acid by mixing it in a retort with the black oxyde of manganese; and the same salutary effects followed: and he has given this saturated solution in doses of half or three quarters of an ounce, three or four times a day, mixed with the same quantity of spearmint, or any other distilled water, with evident benefit, in very numerous hepatic cases of great obstinacy.

This account may be rather overcharged, from the ardent mind of its intelligent inventor: but the process is worth following up, and varying in other proportions, as well as employing in other families of diseases. My own use of it is at present too limited to speak with decision; yet, so far as I have tried it, it has certainly appeared to me to allay irritation and produce a tonic effect. In two or three instances, the advantage has been decisive; and patients, who had hitherto been seldom two months without a severe return of the complaint, have entirely escaped, and apparently lost the morbid predisposition. In a few other cases, it has completely failed.

Mr. Wallace has been employing chlorine in the form of gas, obtained by a mixture of muriatic acid with the black oxyde of manganese, as well as diluted with aqueous vapour; and he regards the peculiar eruption, brought out by it, as a favourable sign.*

GEN. I.
SPEC. III.
Icterus
spasmo-
dicus.

In what
manner it
acts,

The state-
ment prob-
ably over-
charged.

But now in
a course of
determina-
tion by
other expe-
riments.

SPECIES IV.

ICTERUS HEPATICUS.

HEPATIC JAUNDICE.

THE COURSE OF THE BILE OBSTRUCTED BY A DERANGEMENT OF THE LIVER FROM SCIRRHOUS OR OTHER INDURATIONS; OCCASIONAL RETCHINGS AND DYSPEPSY: LITTLE OR NO PAIN IN THE RIGHT HYPOCHONDRIUM.

In the preceding species, the appendages to the liver, as the gall-bladder or gall-ducts, are the chief seat of disease, at least in its commencement. In the species before us, the disease is chiefly seated in the liver itself. It may be a result of the preceding species when they have assumed a chronic form; but, as the liver itself is often affected from the first, it is entitled to be treated of as a distinct species. The course of the bile, indeed, is evidently obstructed, but rather in its secretion, or separation from the

GEN. I.
SPEC. IV.
Icterus
hepaticus.
Seat of the
disease.

* Researches respecting the Medical Powers of Chlorine, particularly in Diseases of the Liver, &c. London, 1822.

GEN. I.
SPEC. IV.

Icterus
hepaticus.

This species
different as
described
by different
writers.

Supposed
proximate
causes.

substance of the liver, than in its transmission by the biliary tubes.

This species is noticed by Boerhaave, by Sauvages, and by Dr. Cullen in his Synopsis, though he has offered no remarks on it in his First Lines. In Boerhaave, however, it imports altogether a different disease, for it is jaundice produced by hepatitis*, or inflammation of the liver; and is hence a mere symptom, to be removed alone by a removal of the idiopathic complaint.

It is more accurately described by Richter, who confirms and illustrates the opinion of Vogel and Selle; both of whom suppose it to depend upon some peculiar irritation in the liver itself; or in the whole hepatic system; but an irritation not dependent upon or directly leading to inflammation. This irritation is of various kinds, and produces different effects, all of which become causes of obstruction to a free flow of the bile into its proper channels. One of the most common effects which operate in this manner, is a scirrhus enlargement of the whole, or of some particular part, of the liver. Another is an accumulation of calculous concretions, in its substance; of which Richter gives a striking and complicated example in a person, who, after death, was found to be without a gall-bladder, and whose liver was filled with whitish calculi of different forms and sizes, from that of a pea to that of a cherry. In this case there can be no question, that the bile, whose colouring matter was diffused over the entire body, was not only formed in, but immediately absorbed from, the penicilli, or pores of the liver, in consequence of obstruction, without being collected into a reservoir.

In what
case accom-
panied with
danger.

This is the worst state in which jaundice can possibly make its appearance; for, though there is little or no pain, it shows disease in the structure of the liver, and is frequently a mark of a broken-up constitution. It is in fact found rarely in the young and vigorous; but almost always in those who have drunk hard, or lived hard, and especially have been exposed to much labour in hot climates, or have suffered under repeated attacks of quartans or other chronic intermittents.

Medicine of
little avail.

The art of medicine can here do but little; and we have too often to witness the picture, drawn so feelingly of the Athenians during the plague:—

— Defessa jacebant

Corpora; mussabat tacito MEDICINA timore.†

Except in
an early
stage of the
disease.
Mercury
how best
employed.

It is only in an early stage of this disease, if happily we should be so soon consulted, that mercury has any chance of being successful; and it should be given rather as an alterant in small doses pertinaciously followed up, than in large proportions so as to excite a ptyalism; for we have here no strength to draw upon without injury. “I think,” say Dr. Baillie, “that many practitioners of the present day have erred in administering mercury too long, and in too liberal doses. When mercury is carried beyond the point that is necessary, it often injures the constitution by weakening it, and rendering the nervous system very irritable.”‡ In

* Van. Swiet. Comment. Hepatitis et Icterus multiplex, tom. iii. § 914.

† Lucr. De Rer. Nat. vi. 1176.

‡ Lectures and Observations on Medicine, 1825. Unpublished.

some cases, small doses of calomel in combination with conium have been serviceable; and I have certainly found benefit from covering the hypochondriac region with a large plaster of the emplastrum hydrargyri cum ammoniaco. For the rest the patient must be put upon a general tonic plan: his diet should be generous without being highly stimulant; he should use such kind of exercise and in such proportion as best agrees with him; and the chalybeate springs, corrected as those of Cheltenham by neutral salts, form the best mineral invigorant to which he can have recourse. Possibly, in this malady also, the diluted aqua regia bath may be of service, employed as recommended under the last species.

[In that state of the liver which produces jaundice towards the end of intermittent fevers, mercury is the best and only remedy; and calomel, in small doses, is the form under which it is the most efficient. When jaundice arises from congestion of the vessels of the liver, general blood-letting, or (if the patient's reduced state prohibit it) local bleeding, by the application of leeches, or cupping-glasses, to the right hypochondrium, will be proper; afterwards, mercurial and iodine frictions are indicated.]

GEN. I.
SPEC. IV.
Icterus
hepaticus.
General
regimen.

Chalybeate
springs.

Aqua regia
bath.

SPECIES V.

ICTERUS INFANTUM.

YELLOW GUM. JAUNDICE OF INFANTS.

THE COURSE OF THE BILE OBSTRUCTED BY VISCID MECONIUM;
WITHOUT PAIN OR DYSPEPSY; EASILY REMOVED BY PUR-
GATIVES.

THIS is the mildest form under which jaundice makes its appearance, and that which is carried off with least trouble. In ordinary cases, the only symptoms are the pathognomonic colour, and a degree of languor and drowsiness beyond what is common to infants on birth or shortly after.

A yellow hue, however, on the surface of infants is not necessarily a symptom of jaundice, properly so called; for Lentin*, Cullen, and many others, have well observed, that such a discoloration may also be the result of a peculiar yellowness of the serum of the blood, unconnected with bile†; analogous to the golden tint, which we so frequently find diffusing itself over the surface of a contusion, when the finer and more limpid parts of the effused fluid have been carried off, and the colouring matter of the serum that still remains behind is hereby become more concentrated: as we shall have to notice more at large when treating of this affection

GEN. I.
SPEC. V.
Icterus
infantum.

Yellow hue
not neces-
sarily a
symptom of
jaundice.

* See Baume's Description de l'Ictere des nouveaux nés, &c. Nîmes, 1788.
—Cull. Synops. Nosol. Gen. xci. 5. note.

† Müller, Dis. de Origine Icteri, maximè ejus, qui infantes recens natos occupat. Jen. 1788.

GEN. I.
SPEC. V.
Icterus
infantum.
Treatment.

under the name of *Aurigo*, constituting the fifth species of the genus *EPICHRYSIS*. *

A dose of castor-oil, or any other active purgative, will generally be sufficient to remove the obstruction, which in almost every instance proceeds from meconium more than ordinarily tenacious, and consequently will carry off the disease. But frequently the mouth of the ductus choledochus communis is so completely infarcted with this viscid matter that purgatives are insufficient; and, in this case, an emetic should be given, and in a few days repeated, if necessary.

Pathology
of icterus.

[Icterus being seldom a disease essentially mortal, and only having, in general, a fatal termination when combined with some serious organic disease, a distinction should be made between persons dying with jaundice, and those dying from it; a distinction first made by the celebrated M. Portal.

The bodies of ictirical subjects usually present the same morbid colour which they exhibited in life. However, according to M. Portal, the intensity of the colour is sometimes diminished; while some bodies, which never showed any marks of jaundice previously to death, afterwards turn of a very deep yellow. A tendency to anasarca is generally noticed, and, when incisions are made in the cellular membrane, a good deal of serum, which is of a more or less yellow hue, flows out. Whatever fluid is found in the ventricles of the brain, or in the chest, or abdomen, is likewise either of that colour, or reddish. In short, every texture, and even the most compact parts, present a yellow tinge; as the fat, the muscles (which with other organs are softened), the membranes, especially the serous ones; the lining of the arterial system; the tendons; the cartilages; the periosteum; and the very bones.

State of the
lungs,
heart, &c.

According to Morgagni, the lungs, heart, liver, spleen, and kidneys are softened, their texture containing a limpid yellow or reddish fluid. Most of the secretions partake of the same tinge.

Of the
liver.

No part, however, is more frequently affected in jaundiced subjects than the liver. Sometimes dissection demonstrates it to be either in a state of chronic inflammation†, or of preternatural volume or smallness, or converted into a fatty matter resembling

* Cl. vi. Ord. iii. Gen. x. This view coincides with that taken by Andral: sometimes, he says, the icteric tint of the skin seems to be merely the result of an effusion of blood in its texture. Such appears especially to be the nature of the icterus of new-born infants, in whom the red hue of the skin may be seen gradually to change into a yellow tint, which, in its turn, is effaced, and replaced by the natural complexion. In the livers of such children, no constant lesion has been noticed, that would account for the jaundice. This organ is said to have been sometimes seen gorged with blood; but it is quite as frequently found in this state, yet uncombined with icterus. See Andral, Anat. Pathol. tom. ii. p. 616.

† In jaundice, an inflammatory condition of the liver, in an obscure form, and often of small extent, may be suspected, when the disease is attended with pain, or tenderness in the region of the liver, though without fever, or any symptoms of active inflammation. The cases of more decided inflammation of the liver are alleged by Dr. Abercrombie to be attended with jaundice only when the inflammation is seated chiefly on or near its concave surface. On Diseases of the Stomach, &c. p. 397.

tallow. Abscesses, ulceration, biliary concretions within its substance, and numerous close adhesions of it to the neighbouring parts, are likewise occasionally discovered after death.

The state, in which the gall-bladder is found, is extremely diversified: very often it contains calculi, of which there may be only one or many. The single one is occasionally very large; the numerous ones, sometimes amounting to hundreds, are usually of diminutive size.* At the same time, the gall-bladder may contain no bile, or be prodigiously distended with it. Van Swieten speaks of a case, in which the gall-bladder reached from the liver to the crista of the ilium, and had more than a pint of bile in it. In some cases, this fluid has been found viscid, almost black, and to contain gritty particles like sand. Dr. Bostock† has given the analysis of the fluid of the gall-bladder in a case of protracted jaundice, accompanying tubercular liver and dropsy. It had an orange colour, and thin consistence; the animal matter in it was almost entirely albumen, with a little colouring matter different from that of the bile; and, in fact, it contained none of the usual biliary principles. In particular examples, the gall-bladder exhibits traces of the effects of inflammation, its coats being thickened and indurated. In one instance, Bonnet found excrescences within its cavity.‡ Sometimes the gall-bladder is adherent to the neighbouring organs. In one patient, who died with jaundice, the gall-bladder and cystic duct were altogether wanting.§

At various points of their course, the hepatic, cystic, and common biliary ducts frequently contain calculi of different sizes. When these concretions lodge either in the hepatic or common duct, they completely block it up; and hence it is often found considerably dilated above the obstruction, and containing a large quantity of bile; a circumstance that does not occur when the foreign body lodges in the cystic duct. Sometimes these several canals are so contracted, that a small probe cannot be introduced into them. Stoll met with the common duct in what he calls a cartilaginous state. Cabrolus has recorded a case of jaundice, in which there was a malformation of the common duct, its end towards the liver being very wide, and its communication with the bowels as minute as the extremity of a capillary vessel. The biliary ducts are often found compressed, and even more or less obliterated by various kinds of tumours formed in their vicinity. A most remarkable enlargement of the biliary ducts, in consequence of the pressure of a scirrhus pancreas on the common duct, is recorded by Mr. Todd. After death more than a quart of bile was found in them. The patient's face is represented to have been quite of an orange colour.|| Dr. Elliotson states, that jaundice has arisen from the lodgment of a lumbricus in the duct of

GEN. I.
SPEC. V.
Icterus.
Pathology.
Gall-bladder.

State of the
biliary
ducts.

* Calculi in the biliary ducts are not unfrequent causes of jaundice. "Their mere presence in the gall-bladder does not usually seem to produce either local or general inconvenience. Out of nineteen instances of biliary calculi, which occurred to Morgagni, besides four to Valsalva, in post-mortem examinations, not one had experienced jaundice."† Dr. Burder in Cyclop. of Pract. Med. Also Andral, Précis d'Anat. Pathol. tom. ii. p. 614.

† See Bright's Reports of Medical Cases, 4to. London, 1827.

‡ De Ictero, Obs. 13.

§ F. T. M. Bourgeoise, De l'Ictère, 4to. Paris, 1814.

|| Dublin Hospital Reports, vol. i. p. 325.

GEN. I.
SPEC. V.
Icterus.
Pathology.

the liver*; and, if this be the case, the opinion entertained by Andral and Cruveilhier, that worms only pass into this situation after the patient's decease, would appear to be incorrect.

When the common duct is rendered completely impervious by the lodgment of a calculus, and yet no jaundice takes place (a fact that has sometimes been noticed), the possibility of the existence of a second biliary duct has been suggested as an explanation of the circumstance. This preternatural arrangement is even admitted as possible, both by Morgagni and Portal, whose statements rest upon several cases, in which it had been traced.

Stomach.

In some individuals, who had been free drinkers, and died with jaundice, Stoll found the pylorus contracted, and a considerable portion of the stomach hard and almost cartilaginous. †

Duode-
num.

Sometimes the duodenum, around the termination of the common duct, has been found scirrhus and ulcerated. Dr. Marsh has related several instances, proving that jaundice may arise from an inflammatory state of the mucous membrane of the duodenum, whereby the mouth of the common duct was obstructed. ‡

Pancreas
and spleen.

Dissections prove, that the compression of the biliary passages may be the result of disease and enlargement of the pancreas or spleen. A case of black jaundice is recorded by Zacutus Lusitanus as having taken place in a person, in whom the spleen was entirely wanting.

Vena
portæ.

Sometimes the vena portæ has been observed to be very considerably enlarged, not merely in its trunk, but its ramifications. Any cause producing an obstruction of the circulation in this vessel may give rise to a species of jaundice very difficult of cure. In one subject, which was opened by M. Honoré, the vena portæ was almost impervious in consequence of a tumour formed in its parietes. The patient had been afflicted with jaundice, and the stomach was cancerous.§

Dropsy,
abscesses
of liver,
gall-bladder
destroyed,
&c.

Amongst other causes of jaundice, dissection, as well as clinical experience, proves, that collections of fluid in the abdomen, and abscesses of the liver, deserve to be particularly mentioned. In a woman whom the editor opened some time ago, at the request of Dr. Pinckard, and whose gall-bladder had been nearly annihilated, there were abscesses occupying at least two thirds of the interior of the liver.

Heart and
lungs.

Jaundice is not an uncommon attendant also on organic diseases of the heart and lungs. When connected with those of the heart, it probably arises from the impeded return of the blood from the liver.||

Though the above account corresponds to what is commonly established by dissection, it is curious, that sometimes all the foregoing morbid changes exist, unaccompanied by the slightest degree of jaundice. And sometimes jaundice prevails in subjects, in whom no organic disease whatever can be traced after death. Here Hoffmann and Morgagni have recourse to the suspicion of spasm of the biliary ducts, which are supposed to become relaxed after death.]

* Lect. at London University, Med. Gaz. for 1832-3, p. 488.

† Ratio Medendi, pars tert.

‡ Dublin Hospital Reports, vol. iii.

§ Archiv. Gén. de Méd. Septembre, 1823.

|| Abercrombie's Pathological and Practical Researches on Diseases of the Stomach, &c. p. 399. ed. 2.

GENUS II.

MELÆNA.

MELENA.

THE COLOUR OF THE EYES AND SKIN YELLOW-GREEN, FULGINOUS, LEADEN, OR LIVID; THE DEJECTIONS DARK-COLOURED, GRUMOUS, PITCHY, OR CONSISTING OF BLOOD, BILE, AND THE INTESTINAL SECRETIONS MORE OR LESS ALTERED; ANXIETY; DEPRESSION OF SPIRITS.*

THIS is the Melæna, or *Μελαίνα νόσος* of the Greeks: a name given to it by Hippocrates, who has been followed up by the Latin writers; among whom, with a mere translation of the term, it is called MORBUS NIGER, or the *Black-disease*, whence the name of BLACK-JAUNDICE.

The colour of the skin under this disease is always dark, but differs considerably in its shades, and even in its hue, in different individuals.† It sometimes approaches to a green; whence by Forestus, Razouz ‡, and other writers, it has been called icteritia or icterus *viridis*; on which account it has of late been described under the name of *Green-Jaundice* by Dr. Baillie.

This versatility of colour is not to be wondered at; for I have already had occasion to observe, that the bile, under different states of a diseased liver or its appendages, exhibits very different appearances. In respect to consistency, it has sometimes been found watery§, viscid, or flaky; in respect to colour green||, muddy, pale-white¶, pitchy-black, eruginous**, and versicoloured; in respect to internal properties, insipid, salt, acid, or acrid and effervescent. In the disease before us, it is always of a dark, and often of a black or pitchy hue. The stools are dark-coloured and occasionally almost black; but the urine is sometimes pale, and generally clear.

Dr. Cullen seems to have been doubtful how to dispose of the genus MELÆNA. In his Synopsis, he has omitted it altogether: in his First Lines, he has briefly noticed it, first under hæmatemesis, and again under diarrhœa, as though melæna were a variety of both these. But, not satisfied with this distribution, he afterwards introduced it into his "Catalogue of Diseases omitted, but which ought not to have been omitted" in his Nosology.

With these occasional dejections of viscid and pitchy bile, and

GEN. II.
How
named by
the Greeks
and Latins.

Colour of
the skin
varies.

Varieties of
the bile.

Bile here
always dark
or black.

Not noticed
distinctly
by Cullen.

Sometimes
accom-
panied with
chocolate-
coloured
and gru-
mous
blood.

* The pale colour of the evacuations, formerly mentioned by Dr. Good in his definition, is here omitted, as inconsistent with the etymology of the term, and the opinions generally entertained of the nature of the disease.—ED.

† Lib. xiii. Obs. 23.

‡ Tables Nosologiques, p. 129.

§ Bianchi. Hist. Hep. p. 129. Sebez. Exercit. Med., p. 93.

|| Aug. Hor., tom. i. lib. xi. ap. 5.

¶ Eph. Nat. Cur. Dec. i. Ann. iv. Obs. 194. — Cent. iii. ix. App. 9.

** Stoll, Rat. Med., part i. p. 292.

GEN. II.
Melæna.

sometimes even without them, there is also frequently a discharge of dark grumous chocolate-coloured blood, accompanied with, or preceded by, a considerable pain in both hypochondria.

[Our author adopted Hoffmann's belief, that, in melæna, the liver and spleen were diseased, and their blood-vessels ruptured. Dissections do not prove the constancy of these circumstances. Dr. Cheyne has known two instances, in which inky blood was vomited up, in consequence of long-continued sea-sickness, where no reason existed for suspecting tumour, or obstruction in any of the solid viscera of the abdomen; facts, proving in his opinion, that melæna may depend solely upon an excitement of the inner surface of the stomach. In the melæna cholæa, referred to a flow of ill-conditioned bile, though this fluid may really deviate very much from its healthy quality, this may depend entirely on some modification of secretion, quite unconnected with structural disease. Thus, as Andral particularly states, no relation can be established between those alterations of the liver which dissection reveals, and the changes of the bile as detected by various tests. In the greater number of diseased states of the liver, attended with change of structure, noticed by this author, the bile in the ducts and the gall-bladder was neither altered in its quantity or qualities. While, in other examples, where anatomy can discover no trace of any change in the parenchyma of the liver, the bile is either more abundant or more scanty than usual, or of a different quality from what it is in the healthy state. "I have (says he) been surprised at the enormous quantities of bile distending the digestive tube, where scarcely a slight hyperemia existed in this canal, and the liver seemed in no way changed.* However, in cases of melæna cholæa, the liver may be diseased, and in the examples which have fallen under the editor's notice, it has generally been so; though it is proper to add, that the subjects of them had all been hard drinkers. In Dr. Markland's case, the liver was smaller than usual, and had a rough shrivelled appearance, with fissures one-eighth of an inch in depth. It contained neither blood nor bile, and was of a natural consistence. The spleen contained little blood, but was of the natural size and appearance.† In the third case, recorded by Portal‡, no visceral disease was discovered after death; however, in two other examples described by him, the liver and spleen were diseased. They were also found diseased, as well as the stomach and small intestines, in a case published by Dr. Cheyne§, who particularly mentions, that the vessels of the liver and spleen appeared to be destitute of blood. In a curious example of sixteen pounds of melæna, found in the colon by Mr. Geoghegan, there were tubercles of the liver, and a stricture of the rectum.||]

Dissec-
tions.

The above symptoms have been accurately distinguished by Hippocrates, who in consequence hereof has noticed the two following species of the disease, which I have copied with little variation

* Andral, Précis d'Anat. Pathol., tom. ii. p. 611.

† See Edin. Med. Journ., No. 79. p. 301.

‡ Mém. sur la Nature, &c. de plusieurs Maladies, tom. ii. Paris, 1808.

§ Dublin Hospital Reports, vol. i. p. 263.

|| Trans. of the Assoc. Physicians of Ireland, vol. i. p. 197.

into our Nosological Synopsis, as forming the best arrangement, and giving the best view of *melæna* that I am acquainted with. GEN. II. *Melæna*.

- | | |
|-------------------|-----------------|
| 1. MELÆNA CHOLÆA. | BLACK JAUNDICE. |
| | GREEN JAUNDICE. |
| 2. ————— CRUENTA. | BLACK VOMIT.* |

SPECIES I.

MELÆNA CHOLÆA.

BLACK JAUNDICE. GREEN JAUNDICE.

OCCASIONAL DEJECTIONS OF DARK OR PITCHY BILE, INTERMIXED WITH THE FECES; OCCASIONAL VOMITINGS OF YELLOWISH-GREEN AND ACID COLLUVIES; GREAT LANGUOR; OFTEN VERTIGO; HYPOCHONDRIA FREE FROM PAIN, BUT TENDER UPON PRESSURE.

THE liver is here generally diseased in its structure, and a morbid deep-coloured bile, fulvous, greenish, or fuliginous, is secreted, instead of the natural excretion; the finer part of the fluid is first absorbed, and afterwards the grosser; and what remains becomes still more viscid, more stagnant, and of a deeper hue.

"In the ordinary use of the term," observes Dr. Marcard of Hanover, "black jaundice means nothing more than yellow jaundice of a more than usually deep dye: yet when the real disease exists to which this name ought to be limited, no practitioner, who closely examines the very dark colour of the skin and of the defluxions, and especially the danger that accompanies it, can avoid concluding that it has something peculiar in its nature, and cannot be merely an intense degree of yellow jaundice. It is highly probable," he con-

GEN. II.
SPEC. I.
Melæna cholæa.
Pathology.

Incorrectly supposed to be a mere aggravation of yellow jaundice.

Produced chiefly by a decay of the biliary organs.

* Dr. Goldie has taken some pains to ascertain precisely what is said about *Μελαῖνα νόστος* in the treatise ascribed to Hippocrates, and he notices, as a remarkable circumstance, that the ancient description contains not a word respecting the black discharges by stool, which Sauvages and the moderns mention as characterising *melæna*. Dr. Goldie states, that our author was evidently mistaken in supposing the two species, *melæna cholæa* and *melæna cruenta*, to have their derivation from Hippocrates; and he does not approve of Dr. Good's generic definition, inserted in the former editions, as seeming to rest wholly on the dark hue of the skin, and not that of the discharge from the alimentary canal. The editor certainly prefers Dr. Goldie's description, which runs thus: — "We mean, therefore, by *melæna*, the occurrence, as a symptom, in any disease, of very dark-coloured, grumous, pitchy, often highly fetid evacuations by stool, commonly joined with sanguineous vomiting; or, we use the word as the name of a disease, in which such evacuations, with or without vomiting of blood, constitute the characteristic symptom. In these two senses authors speak of symptomatic and idiopathic *melæna*; but even where the latter phrase is with most propriety employed, the hemorrhage may generally be traced to some constitutional disorder, or local organic disease, as its primary cause." (See Cyclop. of Pract. Med., art. MELÆNA.) One objection perhaps may be made to Dr. Goldie's definition, namely, that the discharge, when blackish, generally has no smell, and has not that highly fetid quality, which he has specified. — ED.

GEN. II.
SPEC. I.
Melæna
cholæa.

tinues, "that a part of the dark colour may depend upon the hue of the bile itself in a state of morbid secretion; but, along with this, there is also a very great structural decay in the biliary organs as well; a decay, which gives the chief character to the disease; prevents so frequently all beneficial effects from the best medical treatment; and consequently renders the disease so often fatal."*

Descrip-
tion.

The green jaundice is sometimes to be found in young persons, but far oftener in the middle and more advanced periods of life. In men it occurs more frequently than in women, probably on account of the greater wear and tear of their constitution, as more exposed to all weathers and all climates; and appears to be less connected with intemperance than the yellow jaundice; and less disposed to terminate in abdominal dropsy.

Liver often
enlarged
throughout.

In many instances, the hardness and enlargement of the liver extend through its entire structure, but are perhaps more frequently confined to some particular part of it. Upon pressing the region of the liver, the patient is commonly sensible of some degree of tenderness, but otherwise he feels no pain whatever; though he has the same distressing itching of the skin which I have already noticed in yellow jaundice; and sometimes a troublesome sensation of heat in the palms of the hands and soles of the feet.

Pulse natu-
ral or slow.

The pulse, as observed by Dr. Baillie, continues "natural both with respect to strength and frequency, unless some circumstance may have occurred to irritate the constitution for the time." In the more striking cases, however, that have occurred to myself, the pulse has been peculiarly slow, in some instances not amounting at any time to more than fifty beats in a minute, and occasionally to not more than thirty. The stools are generally pale; but, from some irregular excitement of the liver, appear sometimes tinged with bile of a peculiarly dark and pitchy hue; a part of which, from its overflow, rushes into the stomach, and is discharged by the mouth. The urine is deeply loaded with the same, and tinges the linen of a dark tawny hue; it flows freely, and sometimes deposits a pinky sediment.

Sometimes
only thirty
beats in a
minute.

Appetite.

The appetite varies, not only in different persons, but even in the same. Some patients eat with a pretty good habitual inclination. In others, the stomach is extremely capricious; at one time without any desire for food of any kind, at another only relishing particular kinds; and, perhaps, a few days afterwards, evincing a general taste for whatever is introduced upon the table.

Prognos-
tics.

In the preceding species, jaundice is not a dangerous disease, except where the substance of the liver is very generally affected, so as to make an approach to the species before us. In green jaundice the patient rarely recovers. The progress of the disease is always slow, and the patient may labour under it for three, four, five, or even seven years. I have lately lost a patient, who had suffered under it for this last term of time, and was not more than forty-two at his death. He was a captain in the royal navy, of regular habits, who had seen hard service, and been severely tried by a change of climates.

* Medicinische Versuche, &c. Leipsic, 8vo. 1779.

Contrary to what occurs in all the modes of yellow jaundice, the morbid hue is here so deeply rooted in the system that it never quits it. If the patient recover, it may become a few shades lighter, but it never leaves his person altogether, and is always visible in the countenance.

When the pulse has been very slow, I have commonly found it connected with some affection of the head, and particularly apoplectic or epileptic fits.

As there is much obscurity in this disease, its medical treatment is indecisive. Mercurial preparations, which so often aid us in the first species, are rarely of service in the present. Dr. Baillie thinks he has found neutral salts, taken daily as an aperient, of palliative use; but of a radical cure he seems altogether to despair. It has appeared to me, that, though mercury fails when employed alone, combined with antimonials, it is often highly beneficial; and of all preparations of this kind, I have by far preferred the form of Plummer's pill, or, in other words, the submuriate of mercury in union with the præcipitated sulphuret of antimony, with a warm stimulant of gum-resin. I have also found unquestionable benefit from an union of alkalies and bitter tonics; particularly the liquor potassæ with infusion of columbo. The aqua regia bath is another tonic well worth trying. I think I have found it serviceable, but have not yet employed it on a scale that enables me to speak peremptorily. Here also, as in spasmodic jaundice, the counter irritation of the tartar-emetic ointment has occasionally proved highly beneficial. [A medicine, now found to be highly worthy of trial in melæna, is the rectified oil of turpentine, recommended by Mr. Adair*, as will be further noticed at the end of the next section.]

GEN. II.

SPEC. I.

Melæna
cholæa.Morbid hue
never quits
the skin,
even on re-
covery.Sometimes
productive
of apoplexy
or epilepsy.Medical
treatment
indecisive.Neutral
salts some-
times palli-
ate.Plummer's
pill some-
times radi-
cally useful.Alkalies
and bitter
tonics.Aqua regia
bath.Tartar-
emetic
ointment.

SPECIES II.

MELÆNA CRUENTA.

BLACK VOMIT.

OCCASIONAL VOMITINGS AND DEJECTIONS OF GRUMOUS BLOOD, INTERMIXED WITH DARK-COLOURED BILE; PUNGENT, TENSIVE PAIN IN BOTH HYPOCHONDRIA; COMPRESSIVE PAIN AT THE PIT OF THE STOMACH, AND FAINTING.

IN this species, the organs subservient to the formation of bile are generally in a more decayed condition than in the preceding; and it may hence be contemplated as a disease compounded of melæna *choleæ* and hæmatemesis *atonica*, or passive hemorrhage from the vessels of the liver, spleen, or both; sometimes from those of the stomach.

Little as we know of the exact part performed in the animal

GEN. II.

SPEC. II.

Melæna
cruenta.Compound-
ed of the
preceding
species and
passive
hemor-
rhage of

* Medical Facts and Obs., vol. iv.

GEN. II.
SPEC. II.
Melæna
cruenta.
liver or
spleen.

Functions
of both
these or-
gans in
many re-
spect
similar.

Blood of
the spleen
does not co-
agulate.

Disease
how ex-
plained by
Dr. Home.

economy by these organs, we see enough to convince us, that the functions of the liver and of the spleen are intimately connected; the blood in both is highly carbonated, as even the natural colour sufficiently indicates; and the closest alliance subsists between them. On which account Hippocrates calls the spleen the *left*, and Aristotle the *bastard* liver. It is a singular property of the blood of the spleen, that, like the catamenial discharge, it does not coagulate.

Dr. Home took a like view of this disease: and affirmed it to be produced, not by a mere effusion of bile of a darker colour, as in black or yellow jaundice, but by an effusion of blood also, which, however, he imagined to proceed from the meseraic veins. He relates three cases, in which the disease appeared to be carried off by a critical discharge; the first by a diarrhœa, and the other two by an efflux of sweat and thick urine.

[The preceding observations require some comment. The doctrine, that the disease is invariably connected with a morbid change of the liver and spleen, has been already refuted by a reference to dissections performed by M. Portal and Dr. Markland. The hypothesis also of ruptured vessels in these organs being the source of the blood in the intestinal canal, is very repugnant both to the plain truths of anatomy, and to the facts disclosed in the dissection of persons carried off by the complaint. According to Portal, three kinds of matter are vomited up in melæna; blood not changed; blood so changed as not to be recognised; and bile, which may also be of a deep black colour.* When the stools are inodorous, and present a yellow colour on being diluted with water, Dr. Brooks sets down the case as a bilious melæna, in opposition to the sanguineous.† Anciently the liver was fancied to secrete a yellow, and the spleen a black, bile; and the inky matter, which is sometimes vomited up, or discharged by stool, was supposed to pass from the spleen into the stomach through the vasa brevia. Dr. Home and M. Portal, however, have proved, that the black matter may transude from the minute arteries of the inner surface of the stomach and intestines; and that it frequently is nothing more than blood altered from its natural appearance by some peculiar action of the vessels.]

Dr. Baillie has, in a few cases, found this cocoa-like fluid thrown up in great abundance, where the stomach alone has seemed to him to have been solely affected, and the liver to have been apparently unconnected with it, though he admits the concurrent action of both viscera in other cases. But, in these special instances, there has been a peculiar obscurity or uncertainty, which is sufficient to justify us in not placing much reliance upon them. In certain cases, Dr. Baillie tells us, the patients were in some months restored to tolerable health; and here it is difficult to speak with precision as to the extent of the disease. In one case, this distinguished practitioner tells us, the stomach was examined after death; it appeared very capacious; but no structural disease. "SO FAR AS HE RECOLLECTS," was found either in the stomach, the liver, or the spleen.‡

* Mém. sur la Nature des plusieurs Maladies, 8vo. Paris, 1808.

† See Trans. of Assoc. Physicians of Ireland, vol. i. p. 148.

‡ Lectures and Observations on Medicine. Posthumous, 8vo. Printed for Taylor, 1825.

Intemperance, but especially habitual dram-drinking, is the common cause. Besides the symptoms noticed in the definition, it may be observed, that the countenance is chlorotic, and usually full of anxiety; the pulse is quick and feeble; the skin hot and dry; the strength greatly impaired.

As a symptom, this disease is met with in severe attacks of dysentery; but more frequently in those of yellow fever, and especially that variety, or stage of it, which by some writers has been distinguished, though perhaps unnecessarily, by the name of Bulam fever. In this case, the black matter is often formed in a few hours, and at once thrown in great abundance from the stomach before it has had time to be absorbed and enter into the circulation, so as to produce the true atrabilious tinge upon the skin, which distinguishes the idiopathic malady.

In the case described by Dr. Markland, the whole line of the intestinal canal, in its villous coat, appears, on dissection, to have been more or less gangrenous; and half a pint of black grumous blood was found in the stomach. The liver, as already noticed, was of a pale brown colour, smaller than usual, with a shrivelled fissured surface, without either blood or bile.

In so worn out and exhausted a state of the affected organs, or perhaps of the constitution generally, as this disease indicates, little benefit is to be expected from medical treatment. Our first duty, however, is to clear the impeded passages of the grumous matter that obstructs them: and our next, to prevent as much as possible a fresh flow of it. For the former, gentle means, whether in the shape of purgatives or emetics, or both, will answer best; as we have a shattered fabric to work upon, and violence will only add to its weakness. For the second purpose, the alkalies have very generally been had recourse to, sometimes alone, and sometimes in the form of soap; but I have rarely found them of decided benefit. For these I have often substituted acids, and have preferred the vegetable to the mineral, particularly where the constitution has appeared to be broken down generally; as the patient is able to take a much larger proportion of the former than of the latter, because of the corrosive quality which the latter possess; and of the vegetable acids, the fermented or acetous have answered better than the native. Mercurials seem to be of as little service as in the preceding species; except where we have reason to expect a fresh accumulation of the morbid material, in which case they may be employed as a purgative. But, between the paroxysms, bitter tonics, as columbo and simarouba, with such gentle exercise as may be engaged in without fatigue, a light but generous diet, and the use of the Cheltenham waters, are what should chiefly be insisted upon, as best calculated to postpone the fatal issue.

[Our author conceived *melæna cruenta* to be a hopeless case, and, when the liver and other viscera are much diseased, the prognosis must certainly be very unfavourable. It is rather extraordinary, however, that he should not have noticed the occasional efficacy of the oil of turpentine. Besides the observations of Mr. Adair and other practitioners in its favour, two cases of *melæna cruenta* cured by it, are recorded by Dr. Brooks*, and

GEN. II.

SPEC. II.

Melæna cruenta.

Symptoms.

Found as a symptom in yellow fever.

Morbid appearances on dissection.

Medical treatment.

Obstructed passages to be cleared.

Fresh flow to be prevented.

Acids preferable to alkalies, especially vegetable.

Mercurials of little avail.

Bitter tonics.

Turpentine.

* Trans. of Assoc. Physicians of Ireland, vol. i. The following is Dr. Brooks's

GEN. II.
SPEC. II.
Melæna
cruenta.

another by Dr. W. Nicholl.* The latter prescribed it as follows : *R.* Ol. terebinth. ʒ ss; syr. papav. alb. ʒj; aq. menth. vir. ʒj. This draught was given five or six times in the first twenty-four hours, and the annexed clyster twice. *R.* Ol. terebinth. ʒj; mucil. acaciæ ʒ iss; decoct. avenæ ʒ xii. Afterwards twenty drops of turpentine, with four black drops, were given every four hours, and five grains of the blue pill at night. In addition to the preceding authorities in favour of turpentine, I may add those of Dr. Cheyne and Professor Elliotson. The Editor has seen many cases of this disease in the great prisons, where he officiates as surgeon; and, in some instances, much benefit has resulted from calomel combined with opium, blistering the right hypochondrium, and giving small doses of the sulphate of magnesia in the compound infusion of roses.]

GENUS III.

CHOLOLITHUS.

GALL-STONE.

PAIN ABOUT THE REGION OF THE LIVER CATENATING WITH PAIN AT THE PIT OF THE STOMACH; THE PULSE UNCHANGED; SICKNESS; DYSPEPSY; INACTIVITY; BILIOUS CONCRETION IN THE GALL-BLADDER OR BILE-DUCTS.

GEN. III.

Gall-stones
how
formed.

In the preceding species we have had occasion to observe, that the bile is frequently found peculiarly viscid or tenacious, either from original secretion in this state, or from an absorption of its finer and more attenuate parts in the gall-bladder or appended ducts. In the disease before us, we find certain portions of it indurated, and assuming a concrete form, often of a crystallized, sometimes of a laminated structure; and perhaps most commonly of both; evincing a tendency towards crystallized rays in the centre, with concentric laminæ towards the surface.†

[They have generally been considered as closely resembling spermaceti; are soluble in boiling alcohol; in ether; and also very slowly in oil of turpentine. The substance, like spermaceti, was regarded by Chevreul as a peculiar animal principle, and named by him cholesterine. There is, however, another kind of biliary calculus, resembling inspissated bile, but not, like it, soluble in alcohol and water. The two compositions are frequently blended together, forming biliary calculi of intermediate characters.‡]

formula: *R.* Olei terebinthinæ guttas xxv; aq. cinnamomi ʒj; syr. aurantii ʒj. *M.* Fiat haustus ter die sumendus. — Ed.

* Op. cit. vol. iii. p. 274.

† Baillie, *Morbid Anatomy*, Fol. 5. Pl. vi. pp. 109—113. “C'est d'un changement dans la proportion des principes qui composent ordinairement la bile que résulte la formation des calculs biliaires.” Andral, *Précis d'Anat. Pathol.*, tom. ii. p. 614.

‡ See Brande's *Manual of Chemistry*, vol. iii. p. 187. Professor Orfila first proved, that some biliary calculi are essentially composed of picromel.

These concretions were supposed by Fourcroy to consist of a resinous matter combined with a peculiar oil, and a certain quantity of albumen, forming three of the constituent principles of bile. All these principles, however, have of late been denied by Berzelius, who has discovered, that the bile becomes resinous only in the process of experiment, by supersaturating it with acids, while the material, hitherto regarded as albumen, is nothing more than a small portion of mucus, furnished from the gall-bladder.

In all instances, perhaps, gall-stones are inflammable; and when dry, blaze like wax in the flame of a candle. And in some instances Dr. Darwin suspects them to dissolve in the matter of the feces, and to pass away invisibly. It is possible, however, that the cases here alluded to were only examples of spasmodic jaundice; for nothing, but the actual appearance of bilious concretions in the feces, can fully prove their existence; while the general symptoms may be produced by other causes. Gall-stones differ in specific gravity: some have been found heavier than water; others a little lighter, bearing the proportion of nine to ten. In colour they are mostly dark brown; a few are white externally, though still brown within.*

It is possible, that minute biliary concretions may be occasionally formed in the penicilli, or the pores of the liver, perhaps in the ducts; but the gall-bladder is the common seat of their origin: and they are here found of every diversified size, from that of a mustard-seed to that of a pullet's egg; often, indeed, not only completely blocking up the cavity, but distending the bladder far beyond its natural dimensions; and the passing such large concretions shows what wonderful efforts nature is capable of making towards freeing herself from a morbid incumbrance; for the natural size of the ductus communis choledochus scarcely exceeds that of a goose-quill. The change thus occasioned is often very slow; and consequently accompanied with less derangement of the general health than we should expect; but as the bitter of the bile is produced in the cavity of the gall-bladder, and this cavity is hereby generally obliterated, the bile loses a considerable proportion of its bitter taste; and, possibly from the want of bile in the intestines, the evacuations are very irregular. The gall-stone, thus closely impacted, will sometimes remain quiet, and without being detached for many years, with only occasional uneasiness in the hypogastric region.

[The circumstances leading to the formation of gall-stones are very imperfectly known; but a life of indolence is remarked to bring on a disposition to them. They are much more frequent in women than men, and are chiefly met with in persons who have passed the middle and active period of life.†]

"In some patients," says Dr. Heberden, "the jaundice will disappear in two or three days: in others I have seen it continue near a twelvemonth before the gall-stone could pass into the intestine, or fall back into the bladder: nor will this long obstruction of the natural course of the bile have any lasting ill effects, or hinder the patient from being soon reinstated in perfect health after the removal of the obstruction." And as little real inroad

GEN. III.
Chololithus.
Chemical character.

Whether soluble in the feces.

Specific gravity.
Colour.

Found of various sizes.

Effects produced on the bile from obstruction of the gall-bladder.

Course of gall-stone into the intestines.
The obstruction not always seriously mischievous.

* Heberden, Med. Trans., vol. ii. p. 137.

† See Gregory's Elements, p. 488. ed. 2.

GEN. III.
Chololi-
thus.

upon the constitution takes place, in many instances, from a continuance of the concretion in the gall-bladder: "for many," observes the same excellent writer, "have been opened after their death, in whom a very large stone, or many small ones, have been found, without their ever having had in their lifetime any complaint, which could certainly be imputed to this cause. A gall-stone, weighing two drachms, was found in the gall-bladder of the late Lord Bute, though he had never complained of the jaundice, nor of any disorder which I could attribute to this cause."*

Sometimes
mischievous
in various
ways.

The irritation of a gall-stone has occasionally excited inflammation, and, where the gall-stone has existed in the liver, a large abscess; and the inflammation in the latter case assuming the adhesive form, the abscess has opened externally, and the calculus been discharged in this direction, of which a curious example is related by Mr. Blagden.† The calculus, on examination, weighed nearly an ounce and a quarter, and was of an oblong shape. The patient, who was a lady of sixty-six years of age, gradually recovered. [Sometimes a biliary calculus of very large size will produce an adhesion of the gall-bladder to the duodenum, followed by ulceration, by which means the foreign body passes into the bowels, and is voided with the stools. A case, satisfactorily exemplifying this fact, is recorded by Mr. Brayne.‡ In other examples, however, biliary calculi of enormous size have made their way into the intestinal canal, through the ductus choledochus, of which instances have been published by Mr. Thomas§, Dr. Craigie, and others.¶ Instances are related by Andral and others, in which one of the biliary ducts, or the gall-bladder itself, gave way, in consequence of the lodgment of a calculus in one of these organs, and the result was a rapidly fatal peritonitis, from effusion of bile in the cavity of the peritoneum.]

From the absence or presence of pain, the rest or transit of the gall-stone, which give rise to a considerable diversity of symptoms, as well as mode of treatment, the genus is divisible into the two following species:—

1. CHOLOLITHUS QUIESCENS.

2. ————— MEANS.

QUIESCENT GALL-STONES.

PASSING GALL-STONES.

* Medical Trans., vol. ii. p. 134.

† Med. Chir. Trans., vol. xii.

‡ Edinb. Med. Journ., No. 81.

† Op. cit., vol. iv. art. xvi.

§ Ibid. vol. vi. p. 99.

SPECIES I.

CHOLOLITHUS QUIESCENS.

QUIESCENT GALL-STONE.

PAIN ABOUT THE LIVER, AND AT THE PIT OF THE STOMACH, OBTUSE AND OCCASIONAL; THE BILE LESS BITTER THAN USUAL; THE DEJECTIONS IRREGULAR.

IN the quiescent species, the gall-stone remains usually at rest in the gall-bladder or the liver; and, whatever be its size, the growth takes place, and the containing organs dilate so gradually as to produce little or no inconvenience. In Dr. Baillie's plates, there is an example of a concretion of the size of a pullet's egg, which filled up the whole of the fundus. Yet so perfect was the adaptation of nature to the case, that the bladder not only became sufficiently enlarged at its base to hold the concretion, but was also sufficiently enlarged immediately above it to form a new reservoir, and contain very nearly the usual quantity, which the gall-bladder is capable of holding in its healthy state.

At times, however, even in this quiescent form of the disease, we meet with some degree of pain; occasionally, perhaps, produced by a sudden deposit of fresh concrecent matter; occasionally by abrupt starts of some propulsive power which it is difficult to explain; and occasionally by some peculiar and temporary irritation in the coats of the surrounding organ, by which the bowels are apt to be considerably affected.

In this species, however, little medical treatment is necessary: for we have only to correct the commotion of the alvine canal when thus excited, or to quicken its motive power when sluggish; and to have recourse to anodyne fomentations and narcotics internally, if there should at any time be severe pain. And, by palliatives of this kind, many a patient, as I have already observed, has been enabled to possess a comfortable enjoyment of life to old age, whose gall-bladder has, after death, been found loaded with concretions which, there has been good reason to conclude, had been gradually accumulating for thirty or forty years.

[An interesting case of death from inflammation of the gall-bladder, caused by the presence of a biliary calculus, was published by Dr. Scott*, of Cupar-Fife. On dissection, the coats of the gall-bladder were found to be half an inch in thickness; in its cavity was a stone, of about the size and shape of a green olive, with a few ounces of a thin blackish fluid, similar to very black-roasted coffee grounds, or rather to ink diffused through thin mucilage. A similar fluid was vomited up during the patient's indisposition.]

GEN. III.

SPEC. I.

In this species, generally little inconvenience from the gradual growth of the gall-stone.

Wonderful adaptation of nature.

Pain and irritation at times.

Medical treatment.

* Edinb. Med. Journ., No. 83. p. 297

SPECIES II.

CHOLOLITHUS MEANS.

PASSING OF GALL-STONES.

PAIN AT THE PIT OF THE STOMACH ACUTE, EXTENDING TO THE BACK; FREQUENT VOMITINGS: DEJECTIONS WHITE; AND AT LENGTH LOADED WITH ONE OR MORE BILIOUS CONCRETIONS.

GEN. III.

SPEC. II.

Pulse rarely quickened in this species, whatever the pain of the stomach.

It is not a little singular that, during the great anguish sustained in the transit of a gall-stone, the pulse is rarely or never quickened. "Insomuch," observes Dr. Heberden, "that this natural state of the pulse, joined with the vehement pain about the pit of the stomach, affords the most certain diagnostic of this illness. I have seen," says he, "a man of patience and courage rolling upon the floor, and crying out through the violence of this pain, which I was hardly able to lull into a tolerable state with nine grains of opium given within twenty-four hours, to which he had never been accustomed: and yet his pulse was all the time as perfectly quiet and natural, as it could have been in the sweetest sleep of perfect health."*

Sometimes pain in the right hypochondrium. Accounted for.

Together with the pain at the pit of the stomach, which is acute in almost every instance, there is sometimes a pain also in the region of the liver; and not unfrequently it commences here. For this it is not difficult to account. Membranous canals, with a very few exceptions, are most sensible at their extremities; and an irritation excited in either extremity acts by sympathy upon the other. A stricture in the prostate gland produces pain, while making water, in the glans penis; and, notwithstanding the comparative insensibility of the rectum, which forms one of the exceptions to which I have just referred, faintness at the stomach is almost always accompanied with a relaxation of the sphincter ani, so that the stools issue involuntarily. Now, as a gall-stone is passing, the pain is greatest on its first entrance into any one of the ducts, or on its reaching the extremity of the ductus communis just before it is disgorged into the duodenum, in consequence of the greater sensibility of these parts. In the former instance, its direct seat is in the origin of the canal, near the liver; in the latter, in its termination towards the pit of the stomach: but as the one extremity acts by sympathy on the other, both these organs must be affected in a greater or less degree; and as the duodenum and stomach possess a finer sensibility than the liver, we perceive readily why the pain is more pungent in the former, than in the latter region. When the concretion has fairly entered the ductus communis, the pain remits, but generally returns with sudden violence on its reaching the duodenal point: and we hence see the reason of that additional attack of severe agony which a patient often sustains, after having flattered himself that the disease was completely subdued. The calculus, when voided,

* Med. Trans., ut suprâ.

has sometimes been found to measure nearly two inches in its long diameter, and upwards of three inches and a quarter in its widest circumference.*

In the treatment, all that we can accomplish is to ease, and, as far as possible, accelerate the course of the gall-stone. Formerly, when the gall-bladder was suspected to be completely gorged, its walls thickened from long continued irritation, the concretions too large to be forced forward, and the pain permanent and severe, attempts were made to remove them by a section into the cyst. Bloch† gives a singular case of this kind, in which not fewer than sixty-two distinct calculi were taken away with success. But in general the operation has not answered, or has been followed by a formation of other crops of concretions; so that Morgagni and many later writers‡ of eminence have strongly reprobated the use of the knife, and it is rarely or never had recourse to in our own day. In reality there seems to be no just cause for its use. At the time that the gall-stone is in the bladder, to whatever extent it enlarges, the progress of enlargement is slow, and the capacity of the gall-bladder will, in most cases, without much irritation, and sometimes with very little inconvenience, expand to meet its growth: while, the moment it has quitted the cyst, and has entered into the duct, it is in vain to attempt to follow it up to any particular spot.

Our best and wisest exertions, therefore, must be of a palliative kind, with a view of easing and quickening the passage of the gall-stone. We have no direct means, however, of doing the last: and all we can hope to accomplish, is that of rendering a little collateral assistance to the expulsive efforts which are made by nature herself. The duct becomes dilated by the circumambient pressure of the concretion as it gradually passes forward, urged on by the same action that propels the bile in a state of health. Vomiting, therefore, by compressing the whole abdominal viscera, and, particularly, the full and distended gall-bladder and biliary vessels, may afford one mean of pushing forward the concretion: but a gentle force, and consequently gentle vomits, will promise fairer than those which act violently. Dr. Darwin affirms, that, in two instances, he saw from thirty to fifty gall-stones voided after taking only an oil vomit. If the patient be of tolerable vigour, and inflammation be apprehended, bleeding should precede the exhibition of emetics. Cathartics, by exciting the action of the intestines, and directly stimulating the mouth of the common bile-ducts, contribute, also, to excite action through its entire range, and thus farther favour the expulsion of the concretion. And as we often find its passage evidently opposed by spasmodic constriction, opium, given very freely, and repeated every hour or two, and relaxing the skin by fomentations or the warm-bath, will in such cases be of essential service. Horse-exercise cannot always be made use of: but where it can be submitted to, it is one of the best auxiliaries we can recommend.

We know of no solvent of biliary concretions worth attending to.

* Brayne, *Medico-Chir. Trans.*, vol. xii. art. 21.

† *Medic. Bemerkungen*, No. v.

‡ *De Sed. et Caus. Morb. Ep.* xxxvii. art. 52. — Sharp's *Critical Enquiry*, ch. vi. — Le Dran, *Consultations sur la plupart de Maladies*, &c.

GEN. III.
SPEC. II.
Chololithus
means.

Treatment.

Section
into the
cyst has not
generally
answered.

No just
cause for
the opera-
tion.

Palliatives
most ad-
visable.

Vomiting
how far ser-
viceable.

Venesection.

Cathartics.

Opium.
Fomenta-
tions.

Horse-
exercise.

Biliary
solvents.

GEN. III.
SPEC. II.
Chololithus
means.

Oil of tur-
pentine
how far a
solvent.

Disease not
often fatal.

The essential oil of turpentine was at one time regarded as a very powerful medicine of this kind; and, as such, was strongly recommended and very generally employed by Van Swieten*, Bloch†, Durande‡, and many other celebrated characters, sometimes alone, but more generally combined with alcohol, or the sulphuric or nitric ether. More recent practice, however, has not justified its possession of this virtue; and, if it were ever serviceable, it must have been as an antispasmodic rather than as a solvent. Durande, indeed, seems to have acted upon this view; for his formula consisted of three parts of sulphuric ether to one of the oil. Yet, where there is danger of inflammation, such a medicine must be always too stimulant; and Dr. Percival has good grounds for remarking, that its internal use is productive of mischief.§ It is not often that this disease proves fatal, or even essentially injures the constitution, except where there is an habitual predisposition to the generation of gall-stones, and the frame is worn out by a chronic succession of irritation and pain. [Such predisposition is, perhaps, best counteracted by the exhibition of alkalies, soap, nitric acid, taraxacum, and the Cheltenham and other mineral waters.]

GENUS IV.

PARABYSMA.

VISCERAL TURGESCEENCE.

KNOTTY OR UNEQUAL INTUMESCENCE OF THE ABDOMEN FROM AN INDURATED ENLARGEMENT OF ONE OR MORE OF THE VISCERA CONTRIBUTORY TO THE DIGESTIVE FUNCTION; DERANGEMENT OF THE GENERAL HEALTH.

GEN. IV.
Character
of the
genus.
Former
names.

THIS genus is intended to comprise a natural and extensive division of diseases, consisting in an infarcted protuberance of one or more of the collatitious organs of digestion.

The name under which the disease has been described by Hippocrates, is *megalosplanchnus* (μεγαλόσπλαγχνος) "or big-bowel:" which Cusson and others, on account of its length, have exchanged for *PHYSCONIA*, a word literally importing "inflation;" and so used by both Greeks and Latins. For dismissing the former, there is, perhaps, sufficient reason; but *physconia* ill supplies its place, as conveying no correct or definitive meaning; whence it has been employed by different writers in so loose a manner, as to comprise a variety of organic tumours that have no relation whatever, in origin, position, properties, or mode of cure. The word, therefore, is not worth preserving, either in respect to its primary or general sense: and it is on this account I have ventured to exchange it for

* Constit. Epid., Lugd. Batav. p. 102.

† Bermerkungen, No. v.

‡ Observations sur l'Efficacité du Melange d'Ether Sulphurique et d'Huile Volatile de Térébinthine, &c. — Strab. 1790.

§ Essays. II. p. 232.

PARABYSMA (ΠΑΡΑΒΥΣΜΑ), from παραβύω, a genuine Greek term, in use among the Greek classics, and distinctly signifying morbid *congestion*, *concoction*, or *infarction*, which is the prominent character of the genus.

GEN. IV.
Parabysma.

All the viscera of the abdomen are subject to an indurated enlargement of this kind from various causes, of which some are common to the whole, and others peculiar to themselves; among the former should be especially noticed that destitution of valves in their veins, and consequently that want of support to the returning column of blood which belongs to the veins that are distributed to more superficial parts. The local causes will be noticed when treating of those enlargements in their respective order. The species are numerous, and may be arranged under the following heads:

| | |
|-------------------------|--|
| 1. PARABYSMA HEPATICUM. | TURGESCEENCE OF THE LIVER. |
| 2. ————— SPLENICUM. | TURGESCEENCE OF THE SPLEEN. |
| 3. ————— PANCREATICUM. | TURGESCEENCE OF THE PANCREAS. |
| 4. ————— MESENTERICUM. | TURGESCEENCE OF THE MESENTERY. |
| 5. ————— INTESTINALE. | TURGESCEENCE OF THE INTESTINES. |
| 6. ————— OMENTALE. | TURGESCEENCE OF THE OMENTUM. |
| 7. ————— COMPLICATUM. | TURGESCEENCE COMPOUNDED OF VARIOUS ORGANS. |

SPECIES I.

PARABYSMA HEPATICUM.

TURGESCEENCE OF THE LIVER.

HARD TUMOUR IN THE RIGHT HYPOCHONDRUM, VERGING TOWARDS, AND SOMETIMES APPEARING AT, THE PIT OF THE STOMACH; GENERAL LANGUOR; PALE OR YELLOW COUNTENANCE; DYSPEPSY; DEJECTIONS IRREGULAR, OFTEN WHITISH.

It is necessary to observe, that the word tumour is used in different senses by different writers; commonly importing a morbid, and mostly a circumscribed, swelling or enlargement of any organ; but limited by Mr. Abernethy to "such swellings as arise from some new production, and which make no part of the original composition of the body."* This sense, however, he admits to "trespass

GEN. IV.
SPEC. I.
Tumour used in various senses. Abernethy's definition; too limited.

* Surgical Observations, containing a Classification of Tumours, p. 68. 8vo. 1804.

GEN. IV.
SPEC. I.
Parabysma
hepaticum.

Tuber.

Meaning of
tumour in
the present
work.

Growth of
tumours
not easily
explained.

Simplest
hypothesis.

How
applied by
J. Hunter,

against the usual import of the word;" and seems even too restricted for his own use; since he is soon afterwards obliged, as he confesses, to extend it to enlargements of glands while they still continue to make part of the original composition of the body, and even to perform their function. In the limited sense here aimed at, TUBER would be a far better word than tumour, as less likely to produce confusion, and as already in some degree known to the language of medicine, in a restricted sense, by its diminutive, TUBERCLE. In the present work, the term tumour is employed in its ordinary signification.

There is still much difficulty in accounting for the morbid growth of tumours of any kind, and especially of those which constitute the genus before us: which sometimes are found, on dissection, to consist of an enlargement or extension of the general structure of the affected organ; and sometimes of distinct lumps, or tubers of a very different structure, embedded in the body of the organ, seated on its surface, or merely attached to it by a narrow neck or footstalk.

The simplest mode of conceiving their origin, is by the deposit of some living fluid into a cell of the cellular structure, or the follicular gland of a mucous membrane, possessing an increased excitement by the pressure of the surrounding parts, or from some other cause of irritation. Mr. Hunter believed, as we shall have further occasion to remark when treating of phthisical tubercles, that "the living fluid, which has the greatest tendency to assume a vascular structure when thus collected or effused, is the coagulable part of the blood," for which opinion there seems to be great reason.*

* To this opinion many pathologists would object. Mr. Abernethy's explanation of the origin of tumours seems to Mr. Lawrence to have been suggested by the statements of Mr. Hunter, respecting the production of vessels in coagulated blood, the supposed agency of this process in effecting the union of wounds and fractures, and its occurrence in effusions of blood into serous cavities. "We now know, that the adhesion of wounds, and the union of broken bones, are not accomplished in this way; moreover, that these processes take place most readily, where no coagula are present. I have never seen any satisfactory proof of blood becoming organised, when effused in wounds, bruises, or into serous cavities, or when deposited in aneurismal sacs." (Lawrence, in *Med. Chir. Trans.*, vol. xvii. p. 8.) Neither is Mr. Lawrence satisfied with the doctrine, that the growth of tumours depends upon the effusion of lymph, from inflammation. "Nothing," says he, "is more common, than the interstitial effusion of lymph, in consequence of inflammation; the substance thus poured out is not formed into tumours; it is absorbed as the inflammation subsides, or its partial organization causes the enlargement and condensation of the affected structure. None of the phenomena usually considered as characteristic of inflammation, are observed to precede the formation of tumours. These growths occur insensibly, and often arrive at a considerable size before persons are aware of their existence." (Vol. cit., p. 9.) In the Museum of the Royal College of Surgeons, are some preparations put up by Mr. Hunter, in proof of coagulated blood becoming vascular, as the vessels appeared to him filled with fine injection; but, in a conversation, which the editor once had with Sir Astley Cooper upon this subject, the latter explains the appearance by the coagula having had lymph effused under and around them, and that the vessels had really extended themselves into the lymph, and not the coagulated blood itself. This view agrees with some experiments related by Gendrin. (*Hist. Anat. des Inflammations.*) Professor Carswell sees various objections to Mr. Abernethy's view. The latter, we know, "referred all adventitious formations to the coagulable part of the blood as their origin, and fixed their seat in the cellular tissue, in the parenchyma, and on the surface of organs. This plastic substance was supposed by him to be effused under one or other of these circumstances, to become organised, and to derive the materials of its growth from the vascular system of the surrounding parts. It

And hence, those who have chiefly supported his doctrines in our own day, and especially Sir Everard Home* and Mr. Abernethy†, confine the origin of vascular tuberos growths to the sanguiferous system, and especially its coagulable part alone; while Dr. Baron has still more lately restricted them quite as absolutely to the absorbent system: contending that "our hopes of being able to avert or cure such maladies must rest upon some other means, than those which are merely calculated to subdue vascular action."‡

Either of these views appears to be too narrow. Mr. Hunter has sufficiently shown, that a living principle appertains to almost all the fluids of the living body that are formed for its accretion, though the animal oil seems to possess less than any of the rest. He has shown it to exist in the chyle; it is known to every one to exist in the semen, and is transferred to the egg when it first drops from the body of the mother, and before a single particle of blood is elaborated. It is this, in truth, which is the instinctive principle of healthy living matter, whether animal or vegetable: instinct itself being nothing more than the simple law of life, or of such living principle in a state of activity or operation, directed to the definite end of completing single organs or the general system, preserving them in health, or reproducing them for future use.

It is hence probable, that most, if not all, the living fluids, and not merely those of the coagulable part of the blood, or the semen, have a tendency to produce new forms and tissues, and will do so under a particular state of excitement, and if duly supplied for this purpose. So long as a state of health, or the natural law of the instinctive principle, influences them, these productions will be uniform and definite; but if the healthy power decline, and the natural law dependent upon it cease, the action still continuing without a modifying guide, the productions must be indefinite and anomalous in every possible diversity, according to the contingencies by which they are surrounded. And hence, alone, as it appears to me, can we account for the elaboration of all those infinite varieties of fluids or of fabrics which different tumours present to us; and those monstrous attempts at organization which we occasionally meet with in organs of every description, sometimes simulating or even elaborating hair, sometimes flesh or muscular fibre, sometimes brain, sometimes suet, sometimes honey-comb or other cells, sometimes a tooth, or a nail, or various organs of a fœtus in a nidus where we should least expect to find it, and marvel with

GEN. IV.
SPEC. I.
Parabysma-
hepaticum.
and his
followers.
Hypothesis
of Baron.

Either hypothesis too limited.

Living principle in almost all the fluids of the living body,

and forms the instinctive principle.

Instinct what.

Hence not the coagulable blood only, but most other fluids have a tendency to produce new forms, &c.

These forms definite in health: indefinite in disease.

Hence the vast variety of morbid accretions or growths, daily met with: and their different degrees of organization.

will readily be seen (says Dr. Carswell), that this view of the seat and origin of adventitious formations is both imperfect and inaccurate. Many of these formations are not organised, not tissues, as he believed, and as they were described to be, about the same time, by Laennec, but *amorphous* masses, all the changes which they undergo, being dependent on the influence of external agents." It is further argued, that Mr. Abernethy's doctrine assigns fictitious characters to these formations, and confounds under the same head diseases of an entirely opposite nature. Various reasons are also given against other theories promulgated by Andral and Cruveilhier. See Carswell's *Illustrations of the Elementary Forms of Disease*, p. 2. — ED.

* Transact. of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. i. p. 231.

† Classification of Tumours, p. 11.

‡ Enquiry into the Nature of Tuberculated Secretions, &c. p. 122.

GEN. IV.
SPEC. I.
Parabysma
hepaticum.
Illustrated.

all our might how it could possibly get there. "The tumour," says Mr. Abernethy, "derives its supply of nourishment from the surrounding parts: it seems to live and grow by its own independent powers; and the future structure, which it may acquire, seems to depend on the operation of its own vessels." All this is quite correct; and it is the object of the preceding remarks to show from what source it is possessed of such independent powers, and, by what means they are rendered subservient to such an infinite variety of sportive and anomalous effects.

Doctrine
applies
equally to
the coats or
parenchyma
of or-
gans.

We have thus far supposed the morbid growths before us to have issued from the cellular texture, or the serous or mucous membranes of organs. But there is no difficulty in applying the whole of this argument to the substance or parenchyma of organs as well as to their surface; for effusion may take place in any part of their structure, and the tubercle of the future tumour may consist of a minute drop of such effused fluid within the organized wall, or whatever it be that surrounds or embeds it. And hence the morbid turgescence may consist either in an enlargement of the general substance of the viscus, or in parasitic tubers more or less closely connected with its surface. "There seems every reason to believe," observes Dr. Abercrombie, "that the peculiar deposition which constitutes it (tubercular disease), may take place from any tissue of the body: in some cases, slowly and gradually; in others, the result of a low inflammatory action of a peculiarly unhealthy character."*

Whence
flukes or
worms of-
ten found
in the in-
terior of
organs.

The organ hereby becomes weakened in its healthy action, and consequently is more disposed to fall a prey to whatever vermicles or their eggs are by any means able to obtain an entrance or a deposit in it: and hence it is nothing uncommon to meet with worms of various kinds, as we shall presently have occasion to notice, that have converted one or more tubercles into a nest, or other habitation; and to propagate their kind with great rapidity: and hence more especially the origin of flukes and hydatids in hepatic parabysma. Some constitutions are far more predisposed to such morbid changes than other constitutions; and some animals than other animals. The swine genus more perhaps than any of the rest. It is not however easy, and at times is perhaps impossible, to distinguish between simple limpid tubercles in their first formation and hydatid worms. Dr. Baron has withdrawn himself entirely from the question, and employs the terms almost, if not altogether, synonymously, without venturing to determine upon

The swine
genus par-
ticularly
predisposed
to such
morbid
effects.
Simple
limpid
tubercles
and hyda-
tid worms
not always
distinguish-
able.

* On the Nature and Origin of Tubercular Disease. Trans. of the Medico-Chir. Soc. Edin., vol. i. p. 687. The following, as Dr. Carswell conceives, is a correct definition of tubercles, or rather of the tuberculous matter, which constitutes the essential anatomical character of those diseases, to which the term tubercular is now exclusively restricted. "Tuberculous matter is a pale yellow, or yellowish grey, opaque, unorganised substance, the form, consistence, and composition of which, vary with the nature of the part in which it is formed, and the period at which it is examined." Dr. Carswell sets down the mucous system as by far the most frequent seat of tuberculous matter; as, for instance, the mucous system of the respiratory, digestive, biliary, urinary, and generative organs. It is also formed on the secreting surface of serous membranes, and in the numerous minute cavities of the cellular tissue. One of Dr. Carswell's plates represents tuberculous matter in the substance of the brain and cerebellum, in accidental cellular tissue, and in the blood. See Professor Carswell's Illustrations of the Elementary Forms of Disease, p. 1. — ED.

the animalcular life of what are ordinarily called hydatids, under any form or magnitude. [According to Dr. Baron, the tubercle commences as a vesicle, and is nothing more or less than an hydatid. Dr. Armstrong finds, however, that the vesicular appearance of the tubercle is simply an accidental occurrence, dependent on the texture of the part in which it is placed. Tubercles, he says, may have the vesicular appearance in the lungs; but, if minutely examined, they will be found to be the extremities of the bronchial tubes, or air-cells, into which the peculiar deposit, constituting tubercle, often takes place.* On the serous membranes, Dr. Armstrong has never found them to be, strictly speaking, vesicles. He regards tubercles as secretions from the ultimate ramifications of the arteries.†] Dr. Jenner seems at times to have carried the animalcular hypothesis too far, even admitting that it has a real foundation; and the following passage, which contains a valuable piece of natural history, may at the same time form an illustration of this remark. It occurs in a letter to Dr. Baron:—"Nothing is more common than tubercles in the liver, and among other viscera, of the pig: but these for the most part arise from the common hydatids with thin coats, while those which give birth to the term *measley*, are of a different kind. They pervade almost every part of the animal, the heart, the diaphragm, the serous and the mucous membranes, the eyes, &c. The disease proceeds not unfrequently to such great lengths, that from a fourth to an eighth part of the animal is infested with them. The inferior part of the neck and haunches now become œdematous, and effusions take place into the cavities. These hydatids differ from the hydatids of the liver in being of a more diminutive size; they are for the most part not larger than ordinary shot, and to the feel are almost as hard; they differ, too, in having thicker coats, and consequently have less fluid within them. I have rarely seen them so large as middle-sized peas. Similar to this species of hydatid is that which pervades the interior of the brain of sheep, and appears to be generated on the coats of the ventricles. I have found them adhering to it, and also swimming in the fluid which had been let loose into these cavities, occasioning hydrocephalus internus, vertigo, and death."‡

Now the character of this last hydatid, the *tænia cerebralis* of Leske, has been sufficiently ascertained to admit its animalcular origin; it is rarely larger than a grain of sand, and is furnished with from thirty to thirty-six hooks, by which it fixes itself firmly to the substance of the brain or of its coats, and especially in yearling lambs, producing that staggering or vertiginous disease which is provincially known by the name of *dunt*. It is also highly pro-

GEN. IV.
SPEC. I.
Parabysma
hepaticum.
Terms
employed
synony-
mously by
Baron.

Jenner's
hypothesis.

As applied
to swine.

To sheep.

Remarks.

Dunt.

* This statement is confirmed by Professor Carswell's researches. "Encysted tubercle has generally been described as existing in the lungs, but I feel perfectly satisfied that the term encysted, whether applied to pulmonary tubercle, or to tubercle in any other organ, is almost always incorrect. In the lungs, encysted tubercle is a deception, the distended walls of the air-cells having, in all probability, in almost every case, been taken for cysts. In the like manner, the dilated bulbous extremities of the biliary system have been described as cysts of the liver containing tuberculous matter." See Carswell's Illustrations of the Elem. Forms of Disease, p. 1. — Ed.

† Morbid Anat. of the Bowels, &c., p. 16. 4to. Lond. 1828.

‡ Baron on Tuberculated Accretions, p. 131.

GEN. IV.
SPEC. I.
Parabysma
hepaticum.

Whether
inflamma-
tory action
requisite
for new
growths.
Denied by
Bichat,
who errs in
limiting
tubercles to
serous
tissues
alone.

Arise from
the interior
as well as
the exterior
of organs :
and with-
out any
proofs of in-
flammatory
action :
though
their
growth may
be acce-
lerated by a
certain de-
gree of it.

bable, that the first kind of hydatids here referred to, are equally entitled to an animalcular classification; but the measles tubercles that form the second, seem rather to be an idiopathic disease of the constitution itself, propagating new growths of the same kind from organ to organ through every part of the animal; and in the pig, as well as in other quadrupeds, well ascertained to be induced in many instances by innutritious food as an exciting cause.

It is conceived by many pathologists, that the intumescences we are now considering, necessarily require an inflammatory action of the organ for their production; and that they are, in fact, for the most part, merely results of what is called chronic inflammation. M. Bichat has with great justness controverted this opinion, in his remarks on membranous tubercles, that "*foule de petits tubercules blanchâtres qui est si fréquent sur ces membranes**;" and has said that we must look to another quarter than that of phlegmasiæ for their origin: although he seems manifestly to err in regarding tubercles of this kind as solely capable of originating from serous membranes, and never existing in the subjacent substance of an organ, except towards the last stages of the complaint in which they are propagated by the cellular texture: being, in his estimation, "*une affection propre à ces membranes; comme les eruptions miliars le sont à la surface cutanée, comme les aphtes le sont aux surfaces muqueuses.*" The nature of many of the morbid growths belonging to the present genus will abundantly show, that tubercles of all kinds may take their rise from the interior as well as from the surface of organs; as their history will also, that they may originate without any sense of heat or pain, without any augmentation of the pulse, or any other sign of inflammatory action. A certain but low degree of such action may indeed accelerate their growth, and augment their number, as one kind of exciting cause; but congestion from weak action is a cause far more frequent; and accidental irritation not much less so. The subject, however, is still a source of controversy; the opinion of M. Bichat, that inflammation is not a necessary source of tubercles in any case, being powerfully supported by MM. Bayle, Laennec, Rostan, Louis, Velpeau, and Armstrong; while their origin from inflammation alone is as warmly contended for by M. Broussais and his numerous adherents.

[In particular, the latter is the doctrine adopted by Professors Andral† and Cruveilhier‡; and, as Dr. Alison observes, the testimony of Andral is the more valuable, as his previous opinion in regard to the formation of tubercles, appears to have been nearly the same as that of Laennec. The paper and facts by Dr. Alison himself, in support of the same doctrine, are highly interesting. §

Dr. Armstrong, who inclines to the opinion of Bichat, has observed, that, against the idea of tubercle being simply the effect of inflammation, many facts might be adduced. In numerous instances, where tubercular points are scattered over the pleura or peritoneum, the serous membrane is transparent up to these points, and only becomes reddened or opaque when the tubercle

* Anatomie Générale, tom. iv. p. 517.

† Clinique Méd., tom. iii.

‡ Bibliothèque Méd., Sept. 1826.

§ See Edin. Med. Chir. Trans., vol. iii. ed. 1828.

has become progressive or enlarged, so as to act as a local irritant. He considers it probable, that tubercle is connected with fibrinous effusion, but that the latter is not necessarily connected with inflammation. He admits that tubercle and inflammation are often co-existent, and so are the hydatid and tubercle occasionally; but co-existence does not imply a direct dependence or relation.*]

This disease originates from different causes, and is marked by symptoms and effects of very different kinds. The diversity of the symptoms, however, is not always sufficient to point out the real nature of the swelling, which, in many instances, can only be determined by a post-obit examination. Yet the following varieties may be noticed as frequently distinguishable during life :—

- | | |
|-------------------------|--|
| α Coactum. | From simple parenchymatous coacervation. |
| Atonic turgescence. | |
| β Scirrhusom. | Accompanied with a hard and scirrhus feeling.† |
| Scirrhus turgescence. | |
| γ Chololithicum. | Accompanied with an occasional discharge of bilious concretions. |
| Gall-stone turgescence. | |
| δ Helminthicum. | Accompanied with an occasional discharge of worms or larvæ. |
| Vermicular turgescence. | |

* Armstrong, Morbid Anat. of the Bowels, &c., p. 17. Lond. 1828.

† Excluding from present consideration chronic hepatitis, treated of in another part of this work, many of the different conditions of the liver seem to be intended to be comprised under these two first divisions; as, for instance, 1. Simple enlargement of the liver, without change of texture; 2. Tubera of the liver, without disease of its structure; 3. The pale degeneration of the liver, consisting of change of colour, without remarkable alteration of texture; 4. Pale colour of the liver, with induration; 5. Dark induration of the liver; 6. Tuberculated disease of the liver; 7. Tubercles and tubera of various characters, diffused through its substance, with disease of the intervening structure. These and other morbid states are excellently described by Dr. Abercrombie. (See Pathological and Practical Researches on Diseases of the Stomach, Liver, &c., ed. 2. p. 364. et seq. 8vo. 1830.) The black ramollissement or disease, in which the liver is reduced to a dark-coloured mass, of very little consistence, could not, of course, be comprehended under Dr. Good's general definition; neither could the soft, flabby, fatty degeneration of it; but the white encephaloid disease of this organ, corresponding in its nature to fungus hæmatodes, would belong to this place. In considering chronic diseases of the liver, it is necessary to recollect, that this organ consists of a sanguineous or red part, and of a white or yellow, containing bile. Sometimes it is only the red portion that is hypertrophied, so that the organ is enlarged and red; and sometimes the biliary portion, with the bile tubes in a state of hypertrophy, and then the liver is enlarged and pale. Sometimes, without being enlarged at all, it will be pale. The red part is atrophied, the vessels shrink, and the biliary part is either hypertrophied, indurated, or not changed at all. The whole of the liver is sometimes affected in these ways; and, in other instances, only spots, or parts of it. In some situations there may be hypertrophy of the red substance; in others, of the biliary; so as to cause a mottled appearance of the organ, when a section is made of it. In what is termed the *gin-liver*, white lines are seen traversing it, and sometimes granules, varying in size from pins' heads to hazel nuts. Professor Elliotson, from whom the editor has borrowed these valuable remarks, adopts Andral's belief, that the free use of ardent spirits induces a chronic change of the biliary portion of the liver, in which it becomes both hypertrophied and indurated. Sometimes the liver is hardened in particular parts of it; but, on the whole, diminished in size. A gin-liver is mostly of a bright yellow colour, and attended with a degree of ascites, and an opacity and hardness of its peritoneal covering. See Med. Gaz. 1832-3, p. 484. — ED.

GEN. IV.
SPEC. I.
Parabysma
hepaticum.

GEN. IV.

SPEC. I.

α P. hepaticum co-actum.

Found in feeble children, in intemperate liverers, and in new comers into hot climates.

β P. hepaticum scirrhum.

Found chiefly in scrofulous habits and in intemperate livers.

Varies in seat and form.

Sometimes contracted in size by a scirrhus structure.

γ P. hepaticum chololithicum.

Calculi found in different parts,

and under different forms.

δ P. hepaticum helminthicum.

Fluke sometimes found in the human liver.

But chiefly hydatids.

The FIRST of these very generally paves a way to one or other of the three ensuing; and is found most frequently in feeble children who secrete little bile. It is also found very frequently in intemperate eaters, and in foreigners who reside in hot climates; a considerable degree of atony being produced in the liver from the exhausting stimulus of the rays of the sun, and an excessive use of spirituous potations.

In a scrofulous habit, a liver, thus enlarged and infarcted, is apt to become SCHIRRHUS in children, if not early attended to, as it is also in the gormandizers just alluded to, who have long habituated themselves to the luxuries of the table. Sometimes the scirrhus is confined to a part of its margin; sometimes it appears partially on its surface; sometimes it runs through one or the other, or both its lobes: and sometimes, also, the portion that becomes scirrhus evinces a tubercular structure, and consists of clusters of simple tubercles before the scirrhusity takes place.

It is not always, however, that a scirrhus or even a tubercular structure of the liver occasions its enlargement. In many instances, indeed, it does so; but Dr. Baillie has given examples, illustrated by plates, in which the liver has hereby shrunk into a size considerably below its natural proportion.* This disease may be generally detected by an accurate examination of the hypochondrium with the hand.

Almost all the affections of the liver, appertaining to the division before us, appear to owe their origin to atony or hebetude in the organ: and hence the common rise of that VARIETY of turgescence which is accompanied with BILIOUS CALCULI. These are sometimes diffused like granules over the substance of the liver, or amongst the biliary pores; they are sometimes confined to, and load one or more morbid cysts existing in the liver; and are sometimes naked, concrete, and crystallised; of which I have referred to various examples in the volume of Nosology. These are occasionally to be found in the dejections.

In the variety distinguished by the existence of GRUBS AND WORMS, the fluke is, perhaps, sometimes to be found even in the human liver. Doever and Clarke, as already observed, assert this, and Darwin confirms their assertion. That they are found in almost all other animals is admitted by every naturalist; although Dr. Harrison, of Horncastle, has lately ventured to deny that they are to be traced in sheep in the well-known disease called the rot. But the vermicles, chiefly observable in the variety of parabsma before us, are hydatids.

“These,” says Dr. Baillie, “consist of spherical bags of a white

* Morbid Anat., pl. ii. fig. ii. p. 102. In the disease of the liver, described by Laennec, under the name of *Cyrrhose*, from the part looking like a mass of yellow wax, and thought by Cruveilhier to correspond to a tuberculated form of liver disease, spoken of by Dr. Baillie, there is a diminution of the organ, and much deviation of it from its natural shape. It is beautifully illustrated by coloured engravings, in Cruveilhier's *Anatomie Pathol.*, douzième livraison. This pathologist finds that cancerous tumours in the liver are most disposed to form towards its surface, and refers to a case, in which sixteen out of twenty were so situated. The name he assigns to this affection is, “Cancer du foie par masses disséminées.” These masses vary in size from that of a miliary seed to that of the head of a full-grown foetus. He includes, however, in his observations, not merely scirrhus tubercles and tumours of the liver, but those of the fungus hæmatodes kind; and, what will seem extraordinary to English pathologists, asserts that he has met with both varieties in the same liver. — ED.

or light amber colour, more or less transparent, and are lodged in cartilaginous cysts. The cysts are lined with a brownish pulpy membrane, resembling very much the coagulum of the blood; but this membrane is more or less distinctly marked in different cases. The cysts are sometimes surrounded on every side by the substance of the liver, and sometimes are formed at the surface, so as to be partially seen without dissection. The hydatids themselves contain a transparent fluid, which is capable of being coagulated by heat, and by acids, and sometimes contain also smaller hydatids floating in this fluid. On many occasions very small hydatids are found adhering to the coats of the larger hydatids, and appear to the eye like small pearls. Hydatids of this species seem to be animalcules of a very simple structure; and, although they are not often formed in the liver, yet they grow more frequently in this gland than in any other of the body.*

The hydatids die in process of time like other animal forms, and their place is supplied by their progeny. When they die, the bags and cysts are often broken up, and become frittered into minute tatters and filaments, fragments of which pass occasionally by the biliary ducts into the duodenum; and, being rejected with the feces, are at times mistaken for portions of the villous coat of the intestines.

As this species of parabysma depends almost entirely on an atony of the liver, the intumescence increases in many instances in proportion to that atony, and particularly where debility of the liver is combined with a general debility of the entire system. And hence the liver is frequently known to enlarge in proportion as every other organ becomes torpid and decays. On which account the liver is often found of an enormous size in dropsical patients. Mr. Gooch gives a case in which, during dropsy, it acquired the monstrous weight of twenty-eight pounds.† Baldinger reports another instance in which it reached twenty pounds‡; and Bonet a third in which it weighed only two pounds less.§

In recent stages, and especially in children and young persons, this disease may often be successfully attacked by warm purgatives and tonics, and especially by those valuable alterants that change

GEN. IV.
SPEC. I.
δ P. hepaticum helminthicum.

Description of hydatids so found.

Smaller hydatids often found adhering to larger.

Fragments of their cysts often mistaken for portions of the villous coat.

Liver often acquires a prodigious size.

* Morb. Anat., p. 107. pl. 5. The kidneys and the liver are the two organs of the body, which are most subject to the formation of hydatids. In sheep, they have been observed to have a contractile power, but this has not been noticed in the human subject. They sometimes lie within one another, like pill-boxes; sometimes they are attached to each other by peduncles from within, hanging one within the other; and sometimes they grow to the outside of each other. Sometimes they are attached to the liver externally; but, generally speaking, are enclosed in a cyst. (See Professor Elliotson's Lectures, Med. Gazette for 1832-3, p. 486.; also Cruveilhier's Anat. Pathol., livr. 3.) The editor attended a man in the King's Bench, about two years ago, whose abdomen was occupied by a cyst containing several gallons of hydatids, the size of which varied from that of an orange to that of a pea. As the swelling was attended with fluctuation, a trocar was introduced into it, when nothing was discharged but a trivial quantity of glutinous matter. The cyst, which was found after death to be attached to the liver, is placed in the Museum of the London University. Dr. Elliotson attended a curious case of this kind, in which an ulcerated communication was established between the cyst and the air passages, through the diaphragm; and, consequently, the patient used to cough and spit hydatids until she died. For some interesting remarks on encysted tumours of the liver, by Mr. Cæsar Hawkins, see Med. Chir. Trans. vol. 18. — En.

† Med. and Surg. Obs.

‡ N. Magaz. band vii. p. 275.

§ Sepulch. lib. i. sect. xviii.

GEN. IV.

SPEC. I.

§ P. hepaticum helminthicum.

Metallic salts.

Those of mercury most valuable.

Purging to be employed occasionally.

Ammoniac mercurial plaster.

Tartar emetic ointment.

Diluted aqua regia.

Good effects of mercury :

especially when united with antimony ;

as in a case of Sauvages.

the action of both the excretory and absorbent system, diminishing the irritability of the first, and restoring the power of the second, and thus reinvigorating them alike.* Many of the metallic salts and oxides have a tendency to do this, and especially those of zinc, copper, iron, and silver. But those of mercury are, for the present purpose, far more valuable than any of the rest. This mineral should be given in mild forms and gentle doses only, so that it may be persevered in for a considerable period of time. The black or red sulphuret of mercury, or the blue mercurial pill, has been employed indiscriminately ; but small divisions of calomel, as a grain or a grain and a half a day, for an adult, or the compound calomel pills, in the proportion of five or six grains a day, will often answer much better. In the mean time, an occasional purging must be persevered in ; and, if worms be suspected in the intestines, they must be removed by the treatment already laid down. I have also found benefit from an application of the emplastrum hydrargyri cum ammoniaco, large enough to cover the entire hypochondrium : or the use of the tartar emetic ointment, as already recommended in certain conditions of dyspepsy ; and, where particular circumstances have prevented me from using this, from sponging the abdomen daily with aqua regia, diluted with about forty times its measure of water, which, as already observed, reduces it to the sourness of weak vinegar.

As far as my own experience goes, I have had so much reason to be satisfied with the good effects of mercury, that I have rarely employed any other medicine ; and, though I cannot say, with Dr. Cullen, that its effects are to be ascribed solely to the stimulus it gives “ to the excretories, and not at all to any change produced in the state of the fluids,” yet the following remark of the same distinguished writer is entitled to general attention : “ Universally mercury, in its active state, seems to be a stimulus to every sensible and moving fibre of the body, to which it is immediately applied ; and, in consequence, it is particularly a stimulus to every excretory of the system to which it is externally or internally applied. Besides its noted effects upon the excretories of the saliva, it seems to operate upon the whole of those of the alimentary canal. It proves often diuretic ; and I have particular proofs of its reaching and acting upon the organs of perspiration. Although it may sometimes operate more upon certain excretions than upon others, it may be presumed that, when any tolerable quantity is thrown into the body, it is in part distributed over the whole ; and therefore its medicinal effect is, that it is the most universal aperient and deobstruent known.”†

I have not, however, found that it gains much advantage, at least in the disease before us, by being united with sulphur, or sub-doses of nitric acid, as in the pulvis mercurii cinereus of the late Edinburgh Pharmacopœia ; but the sulphurets of antimony seem to increase its effect. M. de Sauvages relates a singular case of this disease, in which this compound effected a cure, upon the authority of M. Broussonet, in whose practice it occurred.‡

* J. Kaemph. Abhandlung von einer neuen Methode die hartnäckigsten Krankheiten des Unterleibes sicher und gründlich zu heilen. 8vo. Leips. 1736.

† Mat. Med. part ii. chap. xvii. p. 443.

‡ Class x. Ord. ii. Gen. ix. Physconia, § 3.

When the disease exists in feeble children, repeated emetics have been of service, by rousing the torpid absorbents of the liver into fresh action. As the use of the prussic acid has of late been revived for several kinds of visceral affections, I ought not to omit stating that, in the form of an infusion of laurel-water (*prunus lauro-cerasus*), it is said by various writers to have been serviceable in the disease before us, some of whom have tried it externally, others internally, and a few in both ways*; but, as I know nothing of it from my own experience, I limit myself to giving this hint.

The preparations of iodine have a far better claim to our attention, not only in respect to the present, but to all the species of parabysma, from their peculiar tendency to promote absorption in morbid growths in general. Dr. Baron†, who has extended and enlarged on M. Coindet's experiments, thinks there is no medicine that can rival their salutary powers. But we shall have occasion to notice them still further when discussing bronchocele, in which they seem especially efficacious. In every trial, however, whether external or internal, they require more caution than is ordinarily exercised, and should be commenced in very small and circumspect doses.

There is also another remedial plan, which has been greatly praised at various periods, and especially of late, for its certainty of success, and that is, a protracted nausea. In many cases this has been unquestionably, and even eminently, serviceable; and tuberosities of extensive range, and in some instances when seated on the surface of the body, or the extreme membranes, occasionally even those of bronchocele, have been wonderfully diminished, or even entirely removed, in a few weeks.

It is only, however, when the general habit appears good, and the general strength pretty firm, that we can reasonably expect any advantage from protracted nausea; and hence, comparatively, but rarely in the present disease, which, as already observed, is for the most part an effect of laxity of structure, or hebetude of action. Weakly infants and children are far more subject to abdominal enlargements of the kind before us, than those in health; and it is well known that we may at will produce any extent of tubercles in the liver of rabbits, by feeding them with poor or insalubrious food.‡

GEN. IV.
SPEC. I

§ P. hepaticum helminthicum.

Emetics when in children.

Prussic acid.

Preparations of iodine.

Protracted nausea.

* Baylie's Pract. Essays. — Percival's Pract. Essays, vol. i. p. 36.

† Illustrations of the Inquiry respecting Tuberculous Diseases, 8vo. 1822.

‡ Under the name of "parabysma hepaticum," Dr. Good seems to have brought together various structural diseases of the liver, the morbid anatomy of which are more particularly described by Laennec, Andral, Abercrombie, Cruveilhier, and other pathologists. "These are diseases," as Professor Elliotson has observed, "in which you can do nothing more, than treat the patient upon the common principles of inflammation, and endeavour to excite absorption by means of iodine and mercury, and support the patient's strength. As to the greater number of them, you cannot, of course, distinguish them during life. You can tell, that there is organic disease, by feeling that the liver is very large; and sometimes you find there are tubera, bumps in the region of the liver; but very often it is impossible to say what exact structural disease there is. If you have seen fungus hæmatodes, or scirrhus in other parts of the body, you may suppose the disease to be of the same nature." (Lectures, Med. Gaz. 1832-3. p. 486.) Dr. Abercrombie is not so much an advocate for mercury as the generality of practitioners are: for those chronic affections of the liver, which are beyond the reach of any human means, he thinks that the treatment should be

SPECIES II.

PARABYSMA SPLENICUM.

TURGESCECE OF THE SPLEEN.

INDURATED TUMOUR IN THE LEFT HYPOCHONDRIMUM, VERGING TOWARDS THE SPINE; PALE COUNTENANCE; GENERAL DEBILITY. *

GEN. IV.

SPEC. II.

Morbid state of the spleen less mischievous than that of most other viscera.

ENLARGEMENT of the spleen is, for the most part, less mischievous than enlargement of the liver; and there is hardly any organ that either nature or art may take so many liberties with, without seriously affecting the general health. It has been found wanting †; it has been found double ‡, and even treble §; and, when in a state of disease, in a few rare instances, it has been utterly extirpated without injury ||, or has continued of an enormous size for thirty years and upwards. ¶ [But, though the spleen cannot be regarded as a vital organ, or one of much sensibility, it appears, as

entirely palliative, consisting of a careful regulation of the diet and the bowels, with mild tonics, &c. This he conceives to be a point of much practical importance, because these affections often exist for a long time, without materially injuring the health of the patient; and, by treatment entirely palliative, his life may be perhaps prolonged, and certainly rendered more comfortable. But, when such cases are treated actively by courses of mercury, the strength, he says, uniformly sinks in a very rapid manner, and the patient's life is often evidently shortened. In several cases of chronic affections of the liver, accompanied by jaundice, he has seen very good effects from the external use of iodine, ʒss. to ʒj. of hog's-lard (See *Fathol. and Pract. Researches on Diseases of the Stomach, Liver, &c.*, p. 386.) Where the liver is enlarged by the growth of acephalocysts in it, the frequency of more than one cyst is a consideration against undertaking any operation for their discharge, and we must agree with Cruveilhier, that the attempt would only be justifiable, when the cyst became adherent to the parietes of the abdomen, or was disposed to make its way outward, and burst of itself. The success which M. Recamier had by puncturing a tumour of this nature, and then employing caustic potassa and injections, is justly considered by Cruveilhier as an exception to what would generally be the result of such practice. (See *Anat. Pathol.*, livraison 3. p. 3.) The bilious discoloration of the fluid in these cysts, often noticed, is ascribed by this eminent pathologist to the biliary tubes not being obliterated in the part occupied by the disease, the consequence of which is, that they effuse bile into the cavity where the acephalocysts are contained. In the case which he has related, the patient did not die of the disease of the liver, or the ascites, but of a gangrenous affection of the lower extremities, arising from an anasarcaous distention of the cellular membrane, and the irritation of scarifications. -- ED.

* The spleen sometimes produces an external swelling, without being enlarged; as when fluid in the pleura presses the diaphragm towards the hypochondrium, and forces the spleen from its usual situation. Enlargement of the left lobe of the liver, or of the left kidney, or certain tumours of the peritonæum itself, may have a similar consequence. See Andral, *Anat. Pathol.*, tom. 2. p. 423. — ED.

† Pohl, *Pr. Casus anatomicus, &c. defecta Lienis*. Lips. 1740.

‡ Schenck, *Observ. lib. iii.* N. 84. Cabrolus, *Observ.* N. 15.

§ Schenck, *loc. citat.*

|| Valisneri, *Opp.* iii. p. 128. Bartholin. *Hist. Anat. Cent. iv.* Hist. 51. Ferguson, in *Phil. Trans.* for 1738.

¶ Darw. i. ii. iii. 18. Sauv. *loc. citat.*

Dr. Abercrombie has correctly remarked*, to exert an important influence upon the functions of the stomach. It may, however, only have this influence when diseased, for, according to numerous experiments performed under the inspection of Baron Dupuytren, the spleen may be removed from dogs, and yet such of these animals as recover from the operation, live afterwards, without the slightest impairment of their digestion, absorption, circulation, respiration, power of barking, secretions, nutrition, locomotion, sensibility, sensations, instinctive faculties, and generative functions.† In general, however, in the human subject, the more the spleen exceeds its natural size, and the longer it continues in this state, the greater is the emaciation of the individual, and the impairment of his health. Respiration, digestion, and the functions of the intestinal canal, must, indeed, unavoidably be disturbed by any considerable enlargement of this organ.

The spleen is liable to acute and chronic inflammation (splenitis); to suppuration‡; mortification; tubercular disease, and the slow suppuration usually following that affection. Inflammation may affect either its external peritoneal covering, or its substance, or, as Andral would say, its fibrous tissue.§ The first case may be

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SPEC. II.
Parabysma
splenicum.

* Edin. Med. Journal, No. 80, p. 1.

† L. et P. P. Assolant, *Recherches sur la Rate*, 8vo. Paris, 1802.

‡ According to Andral, pus is found sometimes in the form of separate little drops in the midst of the coagulated blood of the splenic cells, and sometimes in more ample collections, constituting true abscesses. Some of these are separated from the parenchyma of the organ by a pseudo-membrane; while around others, nothing of this kind is remarked; the pus and blood having no partition between them. Andral has seen one case, in which about three fourths of the parenchyma of the spleen contained nothing but pus; the fibrous tissue, in contact with it, being in some places unaltered, but in others, softened, pulpy, and in progress to destruction. Where the pus had approached the capsule, this was considerably weakened; and it is conceived, that if the patient had lived a little while longer, the pus might have escaped into the cavity of the peritoneum. In fact, abscesses of the spleen, having such a termination, are recorded; while others have burst into the stomach, colon, thorax, or urinary organs, or outwardly through the muscles of the abdomen, or back. One fact, well deserving of recollection, is, that the formation of pus in the spleen seems frequently to be simultaneous with suppuration in other viscera. In an example recorded by Andral, the original disease was in the uterus, in the substance of which, and also in its veins, collections of matter were found after death; but abscesses were likewise noticed in the veins of the pelvis, the spleen, lungs, liver, and brain: examples, in which pus is observed only in the spleen, are considered by Andral as less frequent. One case of this description is mentioned, which took place in a child three years of age, the spleen being converted into little more than a pouch of matter, with hardly any vestiges of its parenchymatous texture remaining. During life the symptoms had been acute pain in the left hypochondrium, continued fever, and some symptoms of irritation of the membranes of the brain. The latter organ, however, as well as the digestive canal, was quite healthy. In some soldiers who had suffered from Walcheren fever, Mr. Wardrop found the spleen reduced to a cyst, full of puriform matter. See Baillie's Works, ed. by Wardrop.—En.

§ Exclusively of lymphatics and some nerves, only the following elementary parts are found in the spleen:—1. A fibrous tissue forming externally the capsule, and divided internally into a multiplicity of filaments, amongst which the blood is effused. 2. A vein, which, in the whole of its course, communicates with the cells by large openings, or perforations in its parietes, and whose cavity is at length confounded with the cells themselves. 3. An artery that splits, directly after its entrance into the spleen, into an infinite number of small branches, which cannot be traced far, but appear to be distributed to the parietes of the cells. See Andral, *Anat. Pathol.*, t. ii. p. 416.

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SPEC. II.
Parabysma
splenicum.

restricted to the investment of the spleen ; but, in almost every instance, the peritoneum of the adjacent organs participates in the affection. In peritonitis, also, the external coat of the spleen is inflamed as well as the rest of the peritoneum. Dr. Abercrombie had an opportunity of seeing a spleen that was studded throughout with innumerable tubercles, all in the solid state, in the body of an infant, aged eight months, who died of extensive disease of the bronchial glands. In a more advanced stage, this tubercular affection presents numerous small abscesses, resembling the vomicae of tubercular lungs. The disease, however, is usually complicated with tubercular disease in other organs, so that it is impossible to ascertain the symptoms, which arise from the affection of the spleen.* Perhaps the tubercular enlargement may be more disposed to occur in scrofulous constitutions ; but it is less frequent than other chronic swellings of the spleen.]

Parabysma splenicum, as a species, is traced under the following varieties : —

- | | |
|----------------------------|---|
| α Coactum. | From simple chronic enlargement. |
| Ague-cake. | |
| β Scirrhusum. | Accompanied with a scirrhus feeling. |
| Scirrhus turgescence. | |
| γ Cartilagosum. | Accompanied with a cartilaginous induration of the coats. |
| Cartilaginous turgescence. | |

α P. splenicum
coactum.

The FIRST VARIETY occurs sometimes as a consequence of menostation, or of a peculiar kind of rheumatism ; but chiefly after obstinate remittents or intermittents, in strumous or other weakly constitutions, or which have been previously debilitated by intemperance.† [It generally arises from intermittent fever, but that it

* Abercrombie, op. cit.

† Andral entertains peculiar opinions respecting the origin of diseases of the spleen : some rare ones, he observes, are seated in the parietes of the internal cells, or in the capsule. The others, which are far more common, and of higher importance, are situated in the matter itself contained in the splenic cells. Although this matter, this coagulated fibrine, has no distinct organisation, it is perhaps more alive than the fibrous tissue around it. More frequently than it, then, it may be affected by irritation ; its nutrition may be so altered, that various morbid products are separated from its own substance ; and pus, worms, &c. may be generated within it. The primary cause of several of these changes is quite unknown ; but there are some others, in which the cause is entirely physical, and more easy of estimation. Thus, certain modifications of colour and consistence, sufficiently remarkable to obtain the name of cancers of the spleen, appear to be simply connected with *obstruction* of one of the venous branches running more or less directly into the splenic vein. In this case, the detention of a little fibrine in the cells of the spleen would seem, according to Andral's views, to be adequate to lead to such modifications of this fibrine, as may give it a carcinomatous, tubercular, or other morbid appearance, &c. Softening of the spleen he refers to the blood in its cells being fluid ; induration, to its dense consistence : change of size, he ascribes to the blood not being returned by the veins with due quickness, or to its deposition in the cells by the arteries, and its subsequent organisation and enlargement. Even the formation of pus, he conceives, may arise from changes in the blood, and in the cells of the spleen. In a part of these doctrines, we recognise the Hunterian opinion concerning the vitality of the blood, and its power of producing vessels within itself, when extravasated or stagnant in living textures. Yet, attentively as these opinions have been examined, and compared with the facts disclosed by morbid anatomy, they are far from being confirmed to the extent which Hunter, and especially Andral,

may take place from other causes, as from suppressions of the menses, or hemorrhoidal discharge. It is also met with, especially in warm climates, in feeble unhealthy children, and seems to be produced by damp situations and bad nourishment.*] When agriculture was in a ruder state than in our own day, and the land left in many parts swampy, and undrained of its stagnant waters; and, consequently, when tertian and quartan intermittents were far more common than they are at present, this disease was also far more frequent and more obstinate. An injudicious and immoderate use of the bark is said also to have contributed to this affection, and very generally to have increased it. And although we meet with no such mischievous effects in the present day, there can be little doubt, that there was much ground for such a charge formerly. In intermittent fevers, Peruvian bark, copiously administered, is not an idle medicine; for if it do not assist, it will be sure to injure. And as it was formerly given in large and frequent doses, in districts where the patient was daily exposed to the operation of the same swampy miasm that produced the disease at first, it is difficult to conceive how it could produce any benefit.

"In enlargement of the spleen," observes Dr. Vetch, in an excellent essay upon this subject †, and whose professional employment among the British army at Walcheren afforded him a large field for observation on the disease before us, "the patient seldom or never complains of much pain in the situation where it might be expected: his appetite is generally good, yet his powers of assimilation are obviously deficient: he loses flesh, and is incapable of any muscular exertion. His features have a peculiar, dark, bilious, or mahogany hue; but, the conjunctiva preserves its white and healthy appearance. Perspiration is in time wholly suspended, and the skin acquires the appearance and feel of satin; the lips are pale, and there is generally much wasting of the gums; the urine is limpid, and secreted very rapidly, but contains little or no urea. The patient's mind is generally morose and desponding." The extremities are commonly colder, and the pulse quicker, than in health, especially towards the evening. Dr. Abercrombie states, that the bowels are generally irregular, and the motions dark-coloured. There is frequently a dry cough, and, in protracted cases, hæmatemesis, and, at last, general dropsy.‡

One of the most singular facts in the pathology of the spleen,

GEN. IV.
SPEC. II.
α P. splenicum
coactum.

Produced
by an inju-
dicious use
of cin-
chona.

would go. When the fibrine of the blood, or coagulating lymph, becomes vascular and organised, it is now most generally believed, that the vessels shoot, or grow, into it from the adjacent ones. Indeed, Andral, after all, does not quite disregard the co-operation of the surrounding vessels in the work of disease; for, says he, the blood in the cells of the spleen, in consequence of having lost its wonted qualities, may act as a foreign body, and irritate the surrounding parts. Then in the latter may commence a process of reaction, the result of which may be sometimes the adhesion of a morbid part, and its separation by a partition from the rest of the spleen; sometimes its expulsion. See Anat. Pathol., tom. ii. p. 419—426. — Ed.

* Abercrombie in *Pathol. and Pract. Researches on the Stomach, Liver, &c.*, p. 411. ed. 2.

† Medical and Physical Journal, 1824.

‡ On Diseases of the Stomach, &c., p. 412. In other cases, the general health is not much disturbed, though the patients have a sallow appearance; and thus the disease may continue for many years. — Ed.

GEN. IV.
SPEC. II.
α P. splenicum
coactum.

adverted to by the same physician, is the very rapid manner in which enlargement of it sometimes takes place, and the equally rapid manner in which it may subside. Several years ago, he saw, along with Dr. Combe, of Leith, a seaman who had contracted ague a few weeks before: there was a firm defined tumour in the situation of the spleen, and projecting downwards several inches; in about a week after this visit, the fever had subsided, and the tumour was entirely gone.

Probably this variety of parabysma splenicum never depends upon tubercles, though enlargements of the organ, from this cause, are not unfrequent.* Dr. Abercrombie has seen an immense bag of hydatids covered by the peritoneal coat of the spleen, the substance of which was little altered †; but this also is an affection that has no connection with ague.]

Treatment.
In infants,
emetics.

When this variety of parabysma has occurred in feeble children, it has often been dispersed by emetics given repeatedly, which stimulate the absorbent vessels into increased activity, and act with considerable success, where a persevering nausea might prove highly mischievous.

Emetic
cataplasms
of tobacco.

Cataplasms that excite vomiting have, for the same reason, in many instances, had the happiest effects. They have commonly been made of tobacco; and Mr. Stedman gives instances of its proving an effectual remedy in both the varieties now adverted to, and in an old man as well as in a boy. ‡ The former had in the first instance been attacked with a general numbness, in consequence of sleeping in the open air in the West Indies, while the serenadas, or night-dews, were gathering around him. This was succeeded by a jaundice, and the jaundice by a parabysma of the liver, in which the spleen also appears to have catenated; the turgescence continuing to increase for five years, in spite of the medicines prescribed for him. A tobacco poultice was at this time applied, and renewed daily for a month. It produced frequent vomitings; but, at the end of the month, the patient was cured. The quantity employed at a time was six ounces: for a child one ounce is sufficient. Cataplasms of common groundsel (*senecio vulgaris* Lin.), the erigerum of the dispensaries, are said to prove equally useful by exciting a like effect.

Groundsel
cataplasms.

* Andral describes tubercles of the spleen as very rare in adults, but more common in children. They hardly ever occur without presenting themselves also in other parts. He has often noticed them in the spleen of horses; and in monkeys they are said to be even more common than the tubercles to which their lungs are so notoriously liable. (Anat. Pathol., tom. ii. p. 431.) Besides hydatids, various other kinds of cysts may be formed in the spleen, and chiefly, according to Andral, within its cells. The most simple are small vesicles, full of serum, which are sometimes dispersed very numerous within the spleen. In some instances, they are detached from one another; in others, they are in clusters. MM. Andral and Reynaud found them not only in the cells, but also in the veins of the spleen; some of them being loose, while others were connected to the parietes of the cells and vessels by a slender pedicle. Others, again, were contained in the very substance of those parietes. Certain cysts of the spleen are far more complex: Andral has seen a fibro-serous cyst, which was filled with fatty matter, in the midst of which some hairs were observed. In another instance, a serous cyst presented itself, the contents of which resembled honey.

— Ep.

† On Diseases of the Stomach, &c., p. 414.

‡ Edin. Med. Essays, vol. ii. art. v.

Dr. Vetch, from an extensive experience of its utility in the Island of Walcheren, strongly recommends a weak infusion of the leaves of the *arbutus uva ursi*, which operates beneficially both as a tonic and a diuretic.* An attack of epistaxis, or an appearance of moisture upon the skin, are generally signs of returning health.

[For an enlargement of the spleen, accompanied with the state of the constitution described by Dr. Vetch, or anæmia, Professor Tomassini has found preparations of iron the best medicines. "It is now generally admitted," says Dr. Abercrombie, "that mercury is uniformly and highly injurious, producing mortification of the mouth and rapid failure of the strength. In the earlier stages, when there is any considerable degree of tenderness, repeated topical bleeding should be employed, followed by blistering or a seton. In other respects, the chief reliance of those who have seen most of the disease, appears to be upon free and continued purging, and especially purgatives combined with tonics. The spleen powder and spleen mixture of Bengal are combinations of rhubarb, jalap, scammony, and cream of tartar, with columbo powder and sulphate of iron. About 20 days are stated by Mr. Twining† as the period which is generally required for reducing by this treatment a very considerable tumefaction of the spleen, if the case has been recent. Others employ nitric acid with aloetic purges. "The natives of India employ the actual cautery, and a combination of aloes, garlic, and vinegar. They also employ aloes, combined with sulphate of iron. It is probable the external use of iodine might be useful."‡]

In TURGESCECE of the SPLEEN, whether originating from the preceding, or produced by a strumous diathesis, the organ sometimes assumes a scirrhus hardness; and, in consequence of this symptom, is often felt more distinctly than in the first variety. It acquires, in some instances, a very large size, though often not so large as the turgescent spleen without scirrhus. Sauvages quotes from Bonet a case, in which, after death, it was found to weigh thirty-three pounds, and to fill the whole of the abdomen. The complaint had lasted seventeen years before the patient died, during nearly the whole of which time she pursued her usual avocations.§ Dr. Baillie has given other singular examples; in one of which the spleen was three times its ordinary size, of a hard, but uniformly solid texture; not tuberculated, nor disposed to suppurate.|| When suppuration, however, takes place, the abscess is sometimes very bulky; and the quantity of pus lodged in it has amounted to fifteen pints.¶

The coats of the spleen are occasionally converted into a soft CARTILAGE, and exhibit a change which is rarely, if at all, found in other viscera. The enlargement in this case, beyond the natural size of the organ, is in general but trifling; and Dr. Baillie records an instance in which there was a diminution of size; the coats, though sometimes evincing irregularities on the surface, are usually smooth and uniform; and it is by these characters that we can

GEN. IV.
SPEC. II.
α P. splenicum
coactum.
Arbutus
uva ursi.

Preparations of
iron.

Topical
bleeding.

Purgatives
joined with
tonics.

Indian
remedies.

Iodine.

Acquires a
large size,
though less
than in the
preceding
variety.

Illustrated.

Very bulky
in suppura-
tion.

γ P. splenicum cartilaginosa.
General
character.

* Med. and Phys. Journ., ut supra.

† Calcutta Trans., vol. iii.

‡ Abercrombie on the Stomach, Liver, &c. p. 412. ed. 2.

§ Class x. Ord. ii. Bonet. ex Hyppol. Bosco.

|| Morb. Anat. Fascic. vi. Pl. iii.

¶ Hist. de l'Acad. des Sciences, 1753, p. 196.

GEN. IV.
SPEC. II.
γ P. splenicum cartilaginolum.

alone judge of the nature of the disease during life. [Littre and Morgagni have seen the peritoneal investment of the spleen partially ossified, and Andral met with one case, in which this organ was merely an osseous shell, with internal bony partitions, between which there was a small quantity of reddish fluid, resembling turbid wine.*]

With regard to the treatment of scirrhus spleen, it is not necessary to add to the remarks already offered under the preceding species.

Conversion
of the
spleen into
a soft dark
mass.

[The whole substance of the spleen is sometimes reduced to a soft mass of a dark colour, resembling a mass of coagulated venous blood, and breaking down under the slightest pressure after its peritoneal coat is laid open. In certain cases it is still softer, and of a pultaceous consistence, or even like a reddish mucus or pus. This change of the spleen is chiefly met with in old persons, or such as have passed the age of forty. Its exact cause is not known; but it has been met with in persons who died with scurvy, or of continued or intermittent fevers; or who had been afflicted with melancholy; had experienced violent pain in the hypochondria and epigastric region; or had had symptoms of melæna; or laboured under ascites. Dr. Abercrombie† suspects, that it arises from inflammatory action. He has observed it, as the only morbid appearance in some obscure cases, which were fatal, with symptoms referable to the stomach; or frequent vomiting, loss of appetite, tendency to costiveness, &c. the pulse remaining undisturbed.‡]

* Anat. Pathol., tom. ii. p. 433.

† Edin. Med. Journ., No. 80. p. 2. Andral's reference of this state of the spleen to the condition of the blood in it, has been already noticed; and, in support of his belief, that it does not arise from inflammatory action, he asks whether it ought not rather to be considered as an emblem of a general change in the whole mass of the blood? Hence its common occurrence in scurvy and typhoid fevers. M. Baillie noticed it in the pernicious intermittents of the Campagna of Rome. What, enquires M. Andral, is the cause of these fevers? Is it splenitis? Or rather, is it not the poison of a miasm, which, by changing the mass of blood, must also modify that which is contained in the spleen? — Ed.

‡ All the diseases of the spleen, which have fallen under the observation of Cruveilhier, have exhibited a character of remission, or intermission; a circumstance which he refers to the remission, or intermission, in the functions of this organ. "If," says he, "on the first accession of intermittent fever, it may be questionable whether the spleen has any concern with the disorder, no doubt can exist at a more advanced period. I have attended many of these cases, where each febrile attack was marked not only by the patient's sense of oppression, swelling, and even pain in the spleen, but by an enlargement of it, very manifest to the physician." According to this distinguished pathologist, the induration of the spleen is always accompanied by an increase of its size and specific gravity, and various degrees of fragility, which eventually subside, and are followed by a state of cohesion and compactness, that he has never noticed in any other tissue, excepting the fibrous transformation. In the *ramollissement*, or softening disease, the spleen never becomes so large as when it is indurated; it is not usual to meet with it above thrice its natural size, though occasionally, in the softened state, it has weighed seven or eight pounds. As for organic diseases of the spleen, such as tubercles, the black degeneration of it, cartilaginous transformation, scirrhus, &c., they are completely irremediable. The same remark applies to collections of hydatids, as far as medicine is concerned; for the only chance of relief must here depend upon their being voided externally, or through some communication formed with the alimentary canal. — Ed.

SPECIES III.

PARABYSMA PANCREATICUM.

TURGESCEENCE OF THE PANCREAS.

HARD ELONGATED TUMOUR, RUNNING TRANSVERSELY IN THE
EPIGASTRIC REGION; DYSPEPSY; GENERAL LANGUOR.

THE following are the chief varieties under which this species shows itself:—

GEN. IV.
SPEC. III.

| | |
|------------------------|--------------------------------|
| α Coactum. | Chronic induration or enlarge- |
| Atonic turgescence. | ment. |
| β Calculosum. | Accompanied with calculous |
| Calculous turgescence. | concretions. |

Diseases of the pancreas occur but rarely. [In many points it resembles the salivary glands, to which it is also analogous in the rarity of its morbid affections. This truth is confirmed by extensive observation, and when the surrounding viscera are found variously altered by disease, the texture of the pancreas often continues quite healthy. To say, however, that this organ is never diseased, would be incorrect.

Inflammation of the pancreas seems to be a rare disease; but several cases of it are recorded by Barbette, Greizel, Tulpius, and Bartholine, where it was found suppurated and gangrenous. Pain, generally referred to the back, but sometimes resembling colic, attended the disorder. In a few cases, there was vomiting; but it does not appear to have been a common symptom. Guido Patin found an immense abscess occupying the whole of the pancreas. Portal met with a similar case in a man, who died suddenly after two or three attacks of vomiting, followed by syncope. The same pathologist found the pancreas gangrenous in a man who died with obscure pain in the abdomen, accompanied by wasting and occasional nausea and diarrhœa. A gentleman, mentioned by Dr. Perceval*, had jaundice and bilious vomiting; a tumour appeared in the epigastrium; his strength failed; blood and fetid pus were discharged by stool; and, in three months he died, gradually exhausted. The pancreas was found much enlarged, and contained a considerable abscess. The ductus communis was obliterated by the pressure.†

The pancreas sometimes contains calculi. De Graaf found seven or eight in the pancreas of a man, who had long been liable to vomiting and diarrhœa. In one enlarged pancreas, Portal found twelve calculi, some of which were as large as nuts. In a case seen by Dr. Baillie‡, the calculi consisted of carbonate of lime; in

* Trans. of the King's and Queen's Colleges, vol. ii.

† Abercrombie, Edin. Med. Journ., No. 79., and Pract. Researches on Dis. of the Stomach, &c. p. 418. ed. 2. A case, in which, on examination after death, the pancreas was found in a state of active inflammation, has been recorded by Mr. Lawrence. See Med. Chir. Trans., vol. xvi. p. 367.

‡ Works, by Wardrop, vol. ii. p. 239.

GEN. IV.

SPEC. III.

Parabysma
pancreati-
cum.

some other instances, their composition has been phosphate of lime.

Dissections prove, that the pancreas is sometimes changed in its texture, size, and figure, in consequence of chronic diseases; but the symptoms are so vague and uncertain, that those which might serve for discrimination, have not yet been pointed out by the most intelligent physicians. No doubt the chief causes of this difficulty depend upon the deep situation of the pancreas, its considerable size, its little sensibility, and the very important organs by which it is surrounded. The valuable researches of Dr. Abercrombie show the remarkable diversity of symptoms in chronic diseases of the pancreas. Of twenty-seven cases, which he found described by various writers, six were fatal, with gradual wasting and obscure dyspeptic complaints, without any urgent symptoms. In eight there was frequent vomiting, with more or less pain in the epigastric region; and thirteen were fatal, with long continued pain without vomiting. In some of these, the pain extended to the back; and in others it was very much increased by taking food. In several of the cases, there were dropsical symptoms; and, in three or four, there was jaundice, from the tumour compressing the biliary ducts. In the morbid appearances also there was great variety, the pancreas being in many of the cases much enlarged; in others in a state of scirrhus hardness, with very little enlargement. No distinct relation could be traced between the urgency of the symptoms and the degree of enlargement, which was very considerable in some examples in which the symptoms were slight and obscure; while hardness, with little or no enlargement, was noticed in some other cases, where the symptoms were defined and violent.]

Of the diseases appertaining to the present species, Dr. Baillie never met with more, than the modifications specified at the commencement of this section.

α P. pan-
creaticum
coactum.
Produced
by an habi-
tual use of
tobacco.

All the ordinary causes that produce ATONY in the liver and spleen may affect the pancreas; but there is one that is peculiar to itself, and that is, an habitual excitement of the excretories of this organ by the daily use of tobacco, whether chewed or smoked, probably from a sympathetic action between the pancreatic and salivary glands, whose functions so closely co-operate, and whose secretions are so nearly alike. Dr. Darwin relates a case of this kind, which terminated in the death of the patient, who had been for many years a great consumer of tobacco, chewing it all the morning, and smoking it all the afternoon.* The substance of the gland is generally hardened, though not determinately scirrhus; and its lobular appearance is preserved.

[With respect to the treatment of enlargements of the pancreas, general and local bleeding, the exhibition of purgatives, the application of a blister to the epigastrium†, and a course of alterative medicines, especially Plummer's pill, or iodine, afford the best chances of benefit.]

β P. pan-
creaticum
calculo-
sum.

In the calculous variety, the concretions are chiefly, and sometimes altogether, found in the excretory duct of the gland and its

* Zoonom. Cl. I. Ord. II. ii. 8.

† See Crampton's case, in Trans. of King's and Queen's College, vol. ii. p. 138.

branches, which, in consequence, are often very much distended, and occasionally filled with them. They are usually of a white colour and very irregular shape, and by these characters, when discharged by the rectum, may be distinguished from gall-stones. As the duct is less sensible than those of the liver, the kidneys, or the bladder, it is not often that much pain or uneasiness is complained of, even when the passage, upon an examination after death, seems to have been long blocked up and upon a stretch.

Emetics, and such exercise as gives a general jar to the animal frame, as riding a hard-trotting horse, will contribute towards dislodging the pent-up concretions; and a free use of acids, acidulous drinks, and especially acidulous mineral waters, will have a tendency to dissolve them.*

GEN. IV.
SPEC. III.
β P. pancreaticum calculosum.
Calculi, where lodged.
Pain obtuse, and where.
Treatment.

SPECIES IV.

PARABYSMA MESENTERICUM.

MESENTERIC TURGESCECE.

INDURATED AND IRREGULAR MASS OF TUMOURS BELOW THE STOMACH, YIELDING TO THE PRESSURE OF THE HAND; PALE, BLOATED COUNTENANCE; ATROPHY; THE APPETITE SELDOM DIMINISHED, OFTEN VORACIOUS.

THIS species shows itself under the following modifications or varieties:—

GEN. IV.
SPEC. IV.

| | |
|---------------------------|---|
| α Helminthicum. | Accompanied with hydatids or other worms. |
| Vermicular turgescence. | |
| β Strumosum. | Accompanied with scrofula; mostly tubercular. |
| Scrofulous turgescence. | |
| γ Scirrhum. | Accompanied with scirrhus. |
| Scirrhus turgescence. | |
| δ Sarcomatosum. | Accompanied with fleshy excrescences. |
| Sarcomatous turgescence. | |
| ε Steatomatosum. | Accompanied with adipose excrescences. |
| Steatomatous turgescence. | |
| ζ Fungosum. | Accompanied with fungous excrescences.† |
| Fungous turgescence. | |

* In some Observations on Diseases of the Pancreas and Duodenum, (Med. Chir. Trans. vol. xviii.), Dr. Bright mentions, that, in the only three instances of a discharge of matter like adipocire from the intestines, where he had had an opportunity of opening the bodies after death, there was a scirrhus state of the head of the pancreas, and fungoid ulceration of the duodenum. Yet, on other occasions, he had seen similar states of disease of these organs, in which no such fatty evacuation had been observed. — ED.

† In one case Mr. Wardrop found the mesenteric glands much enlarged, and converted into a soft medullary pulp. The patient had died of a large fungus hæmatodes of the thigh. In very rare examples, they have been found to contain earthy matter. See Baillie's Works, vol. ii. p. 180.

GEN. IV.
SPEC. IV.
Parabysma
mesenterii-
cum.

Varieties
often inter-
mixed.

Chiefly a
disease of
infancy.

Predispos-
ing causes.

Emaciation
a necessary
effect.

May termi-
nate in
atrophy or
tabes.

The ob-
struction
rarely total.

And hence
life pre-
served for
many
years.

Mesenteric
glands less
employed in
advanced
life.

In old per-
sons some-
times
totally
wanting.

Tumours
sometimes
conglobat-
ed or in
cysts.

These varieties are often complicated by an union of one of them with several others. Thus the strumous modification is sometimes found to have sprouted with fungous caruncles; the sarcomatous evinces a scirrhus or indurated texture; and vermicles are occasionally found in most of them. It is chiefly a disease of infancy; and debility is the proximate cause; but the pre-disposing causes are numerous. Innutritious food, a chronic and exhausting sickness, invagination, an impure atmosphere, a scrofulous diathesis, may all pave the way. And when the chylopoietic organs are hereby weakened, the weakness will soon extend to the mesenteric glands, which will become tumefied, and exhibit a tubercular or other irregular surface to the feel. These symptoms grow daily more manifest; because, as the lacteals which enter them are now obstructed and impervious to the chyle, the whole frame becomes emaciated, the superincumbent fat and muscles waste away, and the coacervated glands rise towards the surface, occupy their place, and are covered with a meagre shrivelled skin alone. And hence any of the varieties of the present species may become a cause of atrophy or tabes; though both these species may also exist without such effect.

A total obstruction, however, to the course of the chyle from a parabysma of the mesenteric glands, does not often occur, certainly by no means so often as is suspected. Mr. Cruikshank admits it to be "possible that children and grown persons may sometimes have died of such obstruction; but," he adds, "in such enlargement of the glands, if they ever take place, we should meet with the stagnation of the chyle in the first set of lacteals; yet I never saw such stagnation on any occasion whatever: but as stagnation of the lymph from obstructed lymphatic glands of other parts is said to have been seen, it may be possible that the chyle, from the causes mentioned, may sometimes have been prevented from getting into the blood-vessels."*

That a total obstruction to the course of the chyle does not necessarily follow very great enlargements of the mesenteric glands is certain, because many patients exist under this disease for a considerable number of years, in some instances not less than ten†; and seem, even at last, to be carried off by hectic fever, or some other cause of irritation, rather than by actual innutrition. In perfect quiet, and freedom from exercise of all kinds, and where the form has acquired its full range of growth, it is astonishing to see how very small a portion of food entering into the system is capable of supporting life; a subject we have already touched upon under *limosis expers*‡; and hence Morgagni and Dr. Hunter are inclined to believe, that in old people the glands of the mesentery become obliterated; while Ruysch contended that, in the latter part of his life, he lived without his lacteals, and that old people in general do the same.

In most of the varieties before us the tumours are often very bulky and conglobated; and at times composed of, or accompanied with cysts filled with a limpid fluid. In one instance, related by

* Anatomy of the Absorbing Vessels, Part I. p. 115.

† Sauv. Cl. x. Ord. II. ix. 6. § 3.

‡ Cl. I. Ord. I. Gen. v. Spec. II. γ.

M. de Sauvages, these amounted to twenty of various sizes; one as large as a child's head, six as large as a man's fist, and the rest equalling hens' and pigeons' eggs. Hence the whole abdomen is in some cases so generally tumefied as to give a semblance of pregnancy, for which the tumefaction has sometimes been mistaken. This is particularly the case with the last variety; and as the appetite, state of the bowels, and bladder are often unaffected, or only affected casually and to appearance capriciously, there is not unfrequently some difficulty in determining between the two. Sometimes the parabysma is peculiarly complicated in its texture, which is glandular, tubercular, scirrhus, and ossific; the glands or tubercles appearing like clusters of walnuts, interspersed with glands of less magnitude, of the size of peas, beans, or filberts; for the origin of which the reader is referred to the remarks under the first species. Dr. Donald Monro gives a case of this kind in a young woman, who died of hectic fever in St. George's Hospital in 1771. Upon laying bare the mesenteric glands after death, they were in some places found to resemble spongy carious bones; not consisting of one large firm piece of bone, but of a number of small pieces united by membranes.

The general outline of the medical treatment will run parallel with the plan already laid down for the cure of *parabysma hepaticum*. If worms exist, the course recommended under the genus *HELMINTHIA* should be carried into effect, according to the kind of worm that discovers itself; a light, nutritious food, substimulant with salt and acid or aromatic condiments, should form the daily repast, with a free exposure to pure air, and such exercise as the patient is best able to take without fatigue. Our chief dependence, however, must be on small doses of mercury; a mercurial plaster with gum ammoniac, large enough to cover the entire seat of disease; or a small portion of mercurial ointment rubbed over the abdomen every night and morning with the friction of the hand, continued for at least half an hour or an hour at each time; in which case the friction will be of almost as much service as the mercury. A salivation is not desirable, for it will only add to the general weakness; and hence whatever preparations are made choice of, they should fall short of producing this effect. The less stimulant and heating of the gum-resins will often also be found serviceable: and especially myrrh, either alone or in combination with the fixed alkalies; and especially with some form of iodine, which, whether used externally as an ointment, or internally in the mode of pills or tincture, has a tendency to afford more relief, and prove a better deobstruent in this species of parabysma than in any other. The aperients employed should be gentle; and where calomel is not thought advisable from any particular circumstance that may occur, rhubarb alone, or in union with some of the neutral salts, will usually be found the best medicine we can have recourse to.

Yet, it is only in recent and uncomplicated cases, that we can fairly hope for success, let our medical plan be what it may. In the scirrhus, sarcomatous, steatomatous, and especially the fungous modifications, and more especially still, where several of these are playing their parts simultaneously, the art of medicine may possibly retard, but can never entirely ward off, the fate that

GEN. IV.
SPEC. IV.
Parabysma-
mesenterii-
cum.

Often of
various
sizes.
Sometimes
very bulky.
Sometimes
both scirr-
rhous and
ossific.

Medical
treatment.

Mercury
in different
forms.

But not to
produce
salivation.

Myrrh with
the fixed
alkalies.

Iodine.

Gentle
aperients.

In chronic
cases suc-
cess rarely
to be hoped
for.

Treatment.

GEN. IV. is approaching, with perhaps a slow, unperceived, and insidious,
 SPEC. IV. but, at the same time, with a certain and irresistible stealth of
 Parabysma footstep.
 mesenterium.

SPECIES V.

PARABYSMA INTESTINALE.

INTESTINAL TURGESCECE.

TUMOUR HARD OR CIRCUMSCRIBED, ROUND OR ELONGATED;
 MOVEABLE UPON THE PRESSURE OF BOTH HANDS; IRREGULAR
 DEJECTIONS; OBSTINATE VOMITING; PYREXY; AND FOR THE
 MOST PART EMACIATION.

GEN. IV. IN this species the coacervation exists in the coats of the intes-
 SPEC. V. tines, and consequently is moveable with them. Almost always,
 Seat of coa- however, a slight degree of adhesive inflammation takes place, and
 cervation. the tumefied part becomes united to the superincumbent parietes,
 or to some other part of the intestinal canal; on which account
 the disease belongs to the present, rather than to the preceding
 Order. It has chiefly occurred under the two following modi-
 fications:—

- | | |
|---------------------------|-------------------------------|
| α Conglomeratum. | Cohesive and conglomerated. |
| Conglomerate turgescence. | |
| β Sarcomatosum. | The tumour circumscribed, and |
| Sarcomatous turgescence. | of a fleshy feel. |

α P. intes-
 tine con-
 glomera-
 tum.

Illustrated
 from Mor-
 gagni.

Morgagni relates a striking instance of the FIRST VARIETY in a man subject to hypochondriacal depressions of mind, as well as to a flux of the hemorrhoidal vessels. Upon an abrupt cessation of the hemorrhage, he soon complained of pains in the abdomen, sometimes sudden and transitory, at other times protracted, but never leaving him intervals of perfect ease. Some months afterwards a hardness and swelling were noticeable in the belly, which gradually augmented, and from the pain and emaciation, and almost incessant vomiting with which it was accompanied, at length exhausted and destroyed him. The tumour lay manifest to the sight as well as to the touch, of a circular shape, equidistant from the ensiform process and the navel, in its diameter about eight fingers' breadth. On dissection, the ileum and adjoining portion of the jejunum were found retracted upwards, coacervated, and firmly adhesive.*

[Inflammation of the peritoneal coat of the intestinal canal is very often followed by a close and more or less general adhesion of the bowels to one another. These adhesions are sometimes so numerous and intimate, that the intestines form only one mass, being inseparably blended with the substance connecting them

* De Sed. et Caus. Morb., tom. ii. Ep. xxxix. N. 21. 25.

together, and making, as it were, a kind of tube winding in the midst of the confused mass.*] GEN. IV.
SPEC. V.

The tumour in the SECOND VARIETY is often of an oblong shape, and lies below the hypochondria, inclining towards the epigastric region, prominent, with unequal hardness. Fantoni relates a case of this kind in a boy of a corpulent make, about ten years of age. It commenced with an excruciating pain in the belly, pyrexia, and vehement vomiting, and was soon followed by a tumour of the above description, but seated on the left side, in size resembling a prolapsed spleen. The patient, worn out by the violence of the symptoms, did not long survive. On dissection, every other part being found healthy, the colon under the stomach and towards the left side, for the length of the palm of the hand, was greatly indurated and distended, with a fleshy, fibrous, and peculiarly-thickened tumour, which contracted the diameter of the gut†, and, if the boy had lived much longer, would, in all probability, have adhered, like the last, to the surrounding parietes. β P. intestinale sarcomatousum.

From the violence of the symptoms, and the little prospect we have of allaying them, this disease is almost hopeless. It commences with a considerable irritability of the part of the intestinal canal that is affected, and the effusion, growth of new matter, distention, and, where it takes place, adhesion, add daily to the irritable state, augment the pain, and keep up the tendency to vomit and reject whatever is introduced into the stomach. Pathology.

There are two indications to be followed up, and but two medicines that offer us any chance of success while holding the indications in view. Our first object should be to allay the irritability, and consequently the pain and sickness, which, after a free loss of blood by cupping, can only be attempted by opium, given in large and repeated doses, if necessary to the amount of ten, twelve, or even fifteen grains a day if the patient be an adult. Ten and twelve grains a day, for three weeks, without intermission, I have myself prescribed, with great comfort to the patient, and without stupor, or even sleep, the night being passed in a kind of refreshing reverie, without a loss of consciousness at any time. The symptoms we thus endeavour to combat not only bring on sure destruction by the exhaustion they produce, but very considerably promote the enlargement of the tumour, and the extent of the adhesions. If we can succeed in keeping these in subjection for a week or two, it is possible that the constitution may be broken in to submit to the new action produced by the change of structure, and the irritability may at length subside. Indications of cure.

We should at the same time endeavour to counteract the morbid change of structure, and particularly to arrest its progress; which constitutes our second indication; and this can only be done by mercurial preparations. Small doses of calomel should, for this purpose, be combined with the opium, while mercurial ointment should at the same time be applied, night and morning, to the seat of pain, and persevered in to ptyalism: for the case is urgent, and not a moment is to be lost. The warm-bath may perhaps afford a temporary relief; but no permanent good is to be expected from it. The bowels, however, may often be conveniently refreshed Large doses of opium often necessary for the first intention.

Mercury in different forms for the second.

* See Meckel, Manuel d'Anat., tom. iii. p. 442.

† Fantoni, Obs. Med. Select., Obs. II.

GEN. IV.
SPEC. V.
β P. intestinale sarcomatousum.

and evacuated by emollient, but, at the same time, laxative, injections. For the rest, the treatment may be conducted as already laid down under the first species.

[In this section, too many different diseases are comprehended under the two varieties, and the divisions of the subject should have been more numerous. An advantageous basis for them might have been derived from morbid anatomy, by which the various swellings and indurations of each particular texture of the bowels might have been determined. Thus the origin of the scirrhus alteration of the intestines in their vascular coat and glandulæ muciparæ, and its subsequent extension to the mucous and muscular coats, might have been explained, as the foundation of one variety. The thickened state, first of the mucous coat, and then of the peritoneal and muscular, from dysentery, with ulceration of the first-mentioned membrane, being only effects, and not the original disease, did not necessarily require description here. But the thickened folds of the mucous membrane, caused by an accumulation of the cellular substance*, might have been enumerated as a variety strictly appertaining to this species.

The remark needs scarcely to be made here, that all organised fleshy indurations, thickenings, tubercles, adhesions, scirrhi, and fungoid swellings, of any portion of the alimentary canal, must be deemed beyond the power of medicine.]

SPECIES VI.

PARABYSMA OMENTALE.

TURGESCECE OF THE OMENTUM.

TUMOUR INDURATED AND DIFFUSED: FREQUENTLY SPREADING OVER THE WHOLE OF THE ABDOMINAL REGION: DYSPNŒA: EMACIATION.

GEN. IV.
SPEC. VI.
Indefined and complicated.
Sometimes of an enormous size.
Illustrated.

THIS species is especially characterised by its extent, and the want of a definitive outline, by which it is particularly distinguished from the preceding. It is usually of a complicated texture; infarcted, scirrhus, tuberculate, and cartilaginous. It has been found of various shapes and magnitudes, from a weight of five pounds to that of twenty, twenty-five, thirty, and, in one instance, fifty-six pounds. In the last case, the patient, a female, appeared to be labouring under an ascites, so generally was the abdomen enlarged. She sunk, gradually worn out by atrophy and pains of various kinds; and, on examining the abdomen, the tumour, occupying the entire cavity of the belly, instantly presented itself to view, enclosed in a pretty thick and stout membrane, chiefly adipose, partly scirrhus and glandular, with a cavity in its interior, filled with a sordid and fetid sanies. Laterally and below, it adhered to the surrounding organs only slightly; but was so firmly

* See Baillie's Works, vol. ii. p. 159.

fixed to the fundus of the stomach and parts adjoining, that it could not be separated without laceration.*

In some instances, the hardness has been almost stony †; in others, osseous ‡; sometimes loaded with many thousand glandules §; and, in several of these, accompanied with excruciating pains.||

Whatever benefit may be expected from medicine, is to be collected from the remarks already offered on the preceding species.

GEN. IV.
SPEC. VI.
Parabysma
omentale.
Sometimes
stony or
osseous.
Treatment.

SPECIES VII.

PARABYSMA COMPLICATUM.

COMPLICATED TURGESCECE.

THE BELLY HARD, ELEVATED, AND DISTENDED AS THOUGH PREGNANT, AND OFTEN SUPPOSED TO BE SO; YET MORE OR LESS KNOTTY AND UNEQUAL: RESPIRATION SELDOM IMPEDED: FOR THE MOST PART, ACUTE PAIN, NAUSEA, OBSTINATE VOMITING AND THIRST.

SEVERAL of the preceding species are complicated as to the nature of the tumour with which the respective organ is affected; the present is complicated, as being compounded of various viscera, which are affected simultaneously. And hence, the symptoms must often differ in different individuals, according to the immediate seat of the disease and the nature of the tumour. The liver is, in perhaps all cases, more or less concerned: sometimes in connexion with the spleen, sometimes with the mesentery; sometimes with the stomach, or intestines; and sometimes with all together. Hildanus found the liver so enlarged as to pass beyond the false ribs of the left side, with the spleen equally enlarged ¶, and fixed to the adjoining lobe of the former organ. Huldenreich, in a woman of forty-five years of age, found the liver scirrhus, weighing fourteen pounds, with a fleshy excrescence in the mesentery, of the size of a child's head. This case was also further complicated with jaundice.** Bartholine mentions a woman of elegant form, in the flower of her age, attacked with another modification of this disease, which at length destroyed her: all the intestines, liver, spleen, and every adjoining viscus, were found intermixed, and buried in fat; the liver being at the same time enlarged and scirrhus, and filling both hypochondria; the stomach thickened and cartilaginous. ††

Dr. Baron has given various examples of the same, both from earlier writers and from his own practice, of which the following

GEN. IV.
SPEC. VII.
Tumour
com-
pounded of
various
viscera.
The liver
almost
always
concerned.

Singular
instance of
complica-
tion.

A second
from
Baron.

* Greg. Horst., Prob. x. Dec. vi.

† Panarol., Pēntec. iii. Obs. 10.

‡ Mongin, Hist. de l'Acad. des Sciences, 1732.

§ Seger. Ephem. Germ.

|| Huxh. Phil. Trans., vol. vii.

¶ Cent. ii. Obs. 45.

** Miscell. Nat. Cur., Ann. vi. vii.

†† Cent. ii. Obs. 6.

GEN. IV.
SPEC. VII.
Parabysma
complica-
tum.

is one of the most illustrative: the patient was a girl of about eighteen, and had laboured under the malady for several months before it proved fatal. "On opening the belly, it was found, that the whole of its contents adhered to each other and to the cavity in such a manner as to form apparently one solid mass. None of the viscera could be distinguished, till the thickened layers of the peritonæum were torn from their adhesions. It was impossible to do this from the intestines, for there the thickening and adhesions had proceeded so far, as to render any attempt at unfolding them impracticable. The mesentery and its glands were in a very diseased state: the latter were about the size of almonds, and had much of the same appearance when cut into. On separating the peritonæum from its adhesions to the diaphragm, the liver was found of a much larger size than natural; it was of a bright copper colour, and, like the intestines, it had lost its proper texture. The fingers pierced it in every direction without resistance, and it appeared like a part in a state of incipient putrefaction. On cutting through the right lobe, a lumbricus was observed in one of the biliary tubes."*

Secondary
effects in
other
organs.

Various morbid changes, as adhesions, thickenings, tubercles, granulated masses, ulceration of the bronchial glands, and purulent discharge, were also observed in the thorax: for all the species of parabysma, when at length accompanied with inflammatory action, are peculiarly apt to spread not only from organ to organ, but from cavity to cavity; and more so from the abdomen to the chest, than the chest to the abdomen.

Rarely to
be cured,
though
sometimes
to be palli-
ated.

Other cases of a striking character are referred to in the author's Nosological Synopsis, which might be easily augmented if necessary; but the present are sufficient to give a general view of the nature, gigantic features, and mischievous effects, of this monstrous race of diseases: diseases, which we can rarely hope to conquer, unless we have an opportunity of strangling them in their infancy; though we may sometimes give a check to their rapid strides, palliate their painful progress, and postpone their fatal triumph.

* On Tuberculated Accretions, &c. p. 25. 8vo. 1819.

CLASS II.

CLASS II.
PNEUMATICA.

DISEASES OF THE RESPIRATORY FUNCTION.

ORDER I.

PHONICA,

AFFECTING THE VOCAL AVENUES.

II.

PNEUMONICA,

AFFECTING THE LUNGS, THEIR MEMBRANES
OR MOTIVE POWER.

CLASS II.

PHYSIOLOGICAL PROEM.

BEFORE we enter on the diseases which disturb the function of respiration, and constitute our Second Class, it may be found advantageous to take a brief survey of the general nature of this function, and of the organs which form its instruments.

The respiratory function is maintained by a current of air, alternately thrown into and thrown out of the chest, and is subservient to two important purposes: that of furnishing us with speech, or the means of vocally communicating and interchanging our ideas; and that of carrying off from the blood a gas recrementory and deleterious to life, and possibly of introducing in its stead one or more gases indispensable to animal existence. It is these two purposes that lay a foundation for the two Orders, into which the Class before us is divided; the first entitled PHONICA, comprising the diseases affecting the VOCAL AVENUES; and the second, PNEUMONICA, comprising those affecting the LUNGS, THEIR MEMBRANES OR MOTIVE POWER.

I. At the root of the tongue lies a minute semilunar bone, which, from its resemblance to the Greek letter ν or *u-pylon*, is called the *hyoid* or *u-like* bone; and immediately from this bone arises a long, cartilaginous tube, which extends to the lungs, and conveys the air backward and forward, in the manner and for the purposes already mentioned. This tube is denominated the trachea or wind-pipe; and the upper part of it, or that immediately connected with the hyoid bone, the larynx; and it is this larynx, or upper part, that alone constitutes the seat of the voice.

[The larynx is situated on the median line, and consequently, according to the doctrine of Bichat, it is regular and symmetrical in its form, like all the organs of animal life. Considered as the upper termination of the trachea, it forms a striking contrast with the lower extremity of that tube, which, consisting of the bronchi, and concerned merely with the functions of organic life, is made up of two lateral portions not resembling each other. The lateral portions of the larynx, on the contrary, are exactly similar. This symmetry is necessary for the harmony of its functions; and a discordant voice would inevitably result from different organisations of the two halves of it, or from inequality in the powers of the muscles of its right and left sides.]

The tube of the larynx, short as it is, consists of five cartilages; the largest, and apparently, though not really, lowermost of which produces that acute projection, or knot in the anterior part of the neck, and especially in the neck of males, of which every one must be sensible, and which was formerly denominated pomum

Purposes of the respiratory function.

Speech.

Removal of a recrementory gas.

Hence two orders of diseases.

I. Vocal avenues.

Hyoid bones.

Larynx.

Its symmetry.

Its cartilages.

I. Vocal avenues.

Glottis.

Chordæ vocales.

Form and diameter of the glottis.

Capable of being perfectly closed in birds and amphibials.

Voice.

Adami, as though it had sprung up in consequence of Adam's having eaten the forbidden fruit. This is not a complete ring, but is open behind, the open space being filled up, in order to make a complete ring, with two other cartilages of a smaller size and power; and which, together, form the glottis, as it is called, or immediate aperture out of the mouth into the larynx. Of these three cartilages, the first is named scutiform, or shield-shaped; the other two, arytenoid, or funnel-shaped. A fourth cartilage lies immediately over this aperture, and closes it in the act of swallowing, so as to direct the food to the œsophagus. From its position it is called epiglottis. These four cartilages are supported by a fifth, which constitutes their basis, is narrow before, and broad behind, and has some resemblance to a seal-ring: on which account it is named cricoid, or annular. [It is situated between the two flat plates composing the thyroid or scutiform cartilage; and, upon its elevated posterior margin, the two little arytenoid cartilages are loosely articulated, so as to admit of free motion. The chordæ vocales are the two long edges of the rima glottidis, which meet together in front. They consist of a peculiar elastic substance, and reach from the fore part of the arytenoid cartilages to the thyroid cartilage. Hence, the size of the rima glottidis must necessarily be altered by every movement of the arytenoid cartilages. In the instrument of the human voice, the chordæ vocales are analogous to the various contrivances for producing vibration in musical wind-instruments.] The larynx is contracted and dilated in a variety of ways by the antagonist powers of different muscles, and the elasticity of its cartilaginous coats: and is covered internally with a very sensible, vascular, and mucous membrane, which is a continuation of the membrane of the mouth.

The form of the glottis, composed of three distinct cartilages, resembles that of a small box, with a minute aperture or rima. In adults this aperture is about ten or eleven lines in length, and two in breadth at its greatest diameter. It is, however, increased or diminished by the action of the arytenoid and cricoid cartilages: and in birds and amphibials, is capable of being so completely closed as to prevent the smallest drop of water from penetrating it, except with the will. In this way, frogs confine the air in the lungs, and live without inspiration for considerable time.

[That the larynx is the primary organ, in which the original sound is produced, is proved by the voice being destroyed or modified by certain diseases and accidents. If an opening be made in the trachea below the larynx, so that no air shall pass through the latter, no voice is produced; when, on the contrary, an opening is made immediately above the glottis, the voice is not affected. In Bichat's experiments, when the epiglottis was confined, or even cut away, the voice was not affected by it; though later observations tend to prove, that it really answers a particular purpose in the vocal apparatus, as will be presently specified. When the same eminent physiologist cut through the arytenoid cartilages, or divided the thyroid longitudinally, he found that the voice was annihilated.]

The organ of the voice, then, is the larynx, its muscles and other appendages; and the voice itself is the sound of the air propelled through, and striking against the sides of the glottis or

aperture into the mouth. The shrillness or roughness of the voice depends on the internal diameter of the glottis, its elasticity, mobility, and lubricity, and the force with which the air is protruded. Speech is the modification of the voice into distinct articulations in the cavity of the glottis itself, or in that of the mouth or of the nostrils.

There is a difficulty, however, in determining by what means the air is rendered sonorous in the glottis, and various explanations have been offered upon the subject. The oldest is that of Galen, who supposed the calibre of the glottis to be alternately expanded and contracted; an idea revived in modern times by Dodart, who at the same time compares its action to that of a flute.* A second explanation is that of M. Ferrein, who supposes the variations of sound to depend upon variations of tension and relaxation in the ligaments of the glottis; and, in this view, such ligaments become vibrating chords, and the entire apparatus approaches the nature of a violin.† A third explanation is that of M. Richerand, who unites the two preceding conjectures, and supposes that the glottis is a wind and a chord instrument at the same time. To these explanations we may add that of Kratzenstein, who regards the glottis, in conjunction with the whole length of the larynx, as a kind of drum‡; and that of M. Blumenbach, who views the former in the light of an Æolian harp.§

[Perhaps, the organ of the human voice is more correctly compared to a clarinette. The rima glottidis is the mouth-piece of the larynx, and corresponds with the reed in the clarinette, or with the lips of a player upon the flute. In pursuing the same simile, as Mr. Mayo has remarked ||, we look for a contrivance, analogous to the stops in the flute or clarinette, by means of which the tube may be shortened, or lengthened, and we find the effect produced by the alternate rising and falling of the larynx. When the larynx is raised, the vocal tube is shortened; when it is depressed, the vocal tube is lengthened.

In forming high, or acute sounds, a contracted state of the glottis, with tension of its ligaments, is required; the air passes rapidly through the narrow opening, and numerous oscillations of its sides are produced. The whole larynx is carried upwards and forwards; and, when the most acute sounds are uttered, the head is thrown backward, in order that the larynx may be elevated through a wider range. This elevation equals nearly half an inch for one octave. That the changes above-mentioned take place is proved, by placing the finger on the larynx, and uttering an acute sound, at which period the ascent of the organ may be plainly felt; by the comparatively acute voice of children and women, in whom the larynx is small, and the glottis consequently narrow; by comparative anatomy, which shows us, that the glottis is small and narrow in singing birds; large and relaxed in animals which utter deep sounds; by the blowing of wind instruments, in which the opening for the passage of the air is always contracted in order to produce the high notes; and also by this general fact, that the

I. Vocal avenues.

Its powers.

Speech.

Air, how rendered sonorous in the glottis.

Hypothesis of Galen :

and Dodart.

Hypothesis of Ferrein :

of Richerand :

of Kratzenstein :

of Blumenbach.

* Mém. de l'Académie, &c. 1700.

† Id. 1741.

‡ Tentamen de Natura et Characteribus Sonorum Literarum Vocalium. 4to. 1781.

§ Instit., sect. ix. x. subsect. 155.

|| Outlines of Human Physiology, p. 333.

I. Vocal avenues.

sounds are always more acute in proportion as these instruments are of smaller size.

In the production of deep or base tones, an opposite state of parts is required: the larynx is carried downwards, and the head itself brought towards the chest. This descent, like the ascent, is about half an inch for an octave. In the male sex, where the larynx is larger, and the glottis consequently more ample, than in the female, the voice has habitually a deeper tone. Eunuchs and women may be taught to sing soprano, but not bass. When very low tones are formed, in which the chordæ vocales are greatly relaxed, the production of sound ceases altogether. A human voice, that has been much exercised, can pass through about two octaves and a half in either direction from the middle; consequently, it has a range in the neck of nearly three inches. The minuteness of the change, capable of altering the tone, must seem truly wonderful, when we reflect, that the breadth of the rima glottidis does not exceed a line at its broadest part, and that the variety of tones is almost endless.*

The force, with which the air is impelled into the flute, the clarinette, or the larynx, is regulated by the action of the muscles of the chest concerned in expiration.

One use of epiglottis.

According to M. Magendie, one use of the epiglottis is to perfect the larynx as a musical instrument. The note of a clarinette, swelled beyond a certain degree of loudness, is apt to break into a higher note; now, M. Grenié discovered, that this imperfection may be remedied by the insertion of a tongue of elastic substance; and, in the organ of the human voice, the epiglottis is precisely such a contrivance.

That much difficulty, however, attends all the foregoing theories, cannot be denied: this is rendered clear enough in a memoir by M. Savart †, who shows that the analogy between musical instruments and the organ of voice is very imperfect.]

Animals only that possess lungs possess a larynx.

Yet of these some are naturally dumb: others lose their voice in particular regions.

Perfection of the voice.

Whence the peculiar sounds of different tribes of animals.

Those animals only that possess lungs, possess a larynx; and hence, none but the three first classes in the Linnæan system, consisting of mammals, birds, and amphibials. Even among these, however, some genera or species are entirely dumb, as the myrmecophaga, or ant-eater; the manis, or pangolin; and the cetaceous tribes; the tortoise, lizards, and serpents; while others lose their voice in particular regions; as the dog is said to do in some parts of America, and quails, and frogs in various districts of Siberia. ‡

It is from the greater or less degree of perfection, with which the larynx is formed in the classes of animals that possess it, that the voice is rendered more or less perfect; and it is by an introduction of superadded membranes, or muscles, into its general structure, or a variation in the shape, position, or elasticity of those that are most common to it, that quadrupeds and other animals are capable of making those peculiar sounds by which their different kinds are respectively characterised; and are able to neigh, bray, bark, or roar; to pur, as the cat and tiger kind; to bleat, as

* See Art. Larynx in Rees's Cyclopædia.

† Magendie, Journ. de Physiol., tom. v. 369.

‡ Blumenb. Comp. Anat., ch. xv. § 193.—Camper. Phil. Trans., vol. lxi. 1779. p. 139.

the sheep ; or to croak, as the frog ; which last, however, has a sac or bag, of a singular character, in the throat or cheek, directly communicating with the larynx, on which their croaking principally depends.

I. Vocal
avenues.

The larynx of the bird class is of a very peculiar kind, and admirably adapted to that sweet and varied music, with which we are so often delighted in the woodlands. In reality, the whole extent of the trachea in birds may be regarded as one vocal apparatus ; for the larynx is divided into two sections, or may rather, perhaps, be considered as two distinct organs, the more complicated, or that in which the parts are more numerous and elaborate, being placed at the bottom of the trachea, where it diverges into two branches or bronchiæ, one for each of the lungs : and the simpler, or that in which the parts are fewer, and consists of those not included in the former, occupying its usual situation, at the upper end of the trachea ; which, however, is still without an epiglottis ; both food and water being, as we have already observed, rendered incapable of penetrating the aperture of the glottis, by another contrivance. The lungs, trachea, and larynx of birds, therefore, may be regarded as forming a complete natural bagpipe ; in which the lungs constitute the pouch and supply the wind ; the trachea itself, the pipe ; the inferior glottis, the reed or mouth-piece which protrudes the simple sound : and the superior glottis, the finger-holes which modify the simple sound into an infinite variety of distinct notes, and at the same time give them utterance.

Larynx of birds
exquisitely
curious.

Forms a natu-
ral bagpipe.

Here, however, as among quadrupeds, we meet with a considerable diversity in the structure of the vocal apparatus, and especially in the length and diameter of the tube or trachea, not only in the different species, but often in the different sexes of the same species, more particularly among aquatic birds. Thus the trachea is straight in the tame or dumb swan (*anas olor*) of both sexes ; whilst in the male musical swan (*anas cygnus*), but not in the female, it winds into a large convolution, contained in the hollow of the sternum. In the spoonbill (*platalea leucorodia*), as also in the mot-mot pheasant (*phasianus mot-mot*), and some others, similar windings of the trachea occur, not inclosed in the sternum. The males of the duck and merganser (*anas* and *mergus*) have, at their inferior larynx, a bony addition to the cavity, which contributes to strengthen their voice.

Yet varies in
the different
genera and
sexes.

Anas olor.

Anas cygnus.

Spoonbill.

Mot-mot
pheasant.

Duck.

Merganser.

Among singing-birds, Mr. Hunter, who, at the request of Mr. Pennant, dissected the larynx of many distinct kinds, observes, that the loudest songsters have the strongest muscles, and that the skylark has the strongest of the whole ; whose clear and vigorous note is often heard, when he can no longer be followed in his ascent by the most penetrating eye. He observes also that, among this division of birds, the muscles of the male, following the same rule, are stronger than those of its respective female, whose voice is always less powerful. In birds that have no natural voice, he perceived no difference of muscular power in the larynx of either sex.

Singing-birds.

From this more extensive and complicated machinery in the vocal organ of birds, we find numerous species possessing powers of a very extraordinary kind. In many of them, as the thrush and the nightingale, the natural song is exquisitely varied, and through

Hence extra-
ordinary powers
in many kinds.

Thrush.
Nightingale.

I. Vocal
avenues.Tuneful
manakin.Imitating-
birds.

Bulfinch.

Parrot and
crow kinds.

Nightingale.

Mocking-bird,
its wonderful
powers.Seat of the im-
itative voice.Imitative voice
in man.

Ventriloquism.

Description.

How accounted
for formerly.Not supported
by anatomy.

an astonishing length of scale. In the *pipra musica*, or tuneful manakin, the song is not only intrinsically sweet, but forms a complete octave; one note succeeding another, in ascending and measured intervals, through the whole range of its diapason. There are various kinds that are capable of imitating the music of human art, and amuse us by acquiring national and popular tunes; as the bulfinch, the linnet, and even the robin, when reared in a state of separation from all other birds; whilst some, again, are capable of imitating human speech, as the parrot, the jay, and jackdaw, and, indeed, most of the psittacus and corvus genera; a fact, which proves the possession of a powerful and retentive memory, as well as of a precise and delicate ear. A linnet, according to Mr. Pennant, was once taught the same at Kensington; and even the nightingale is said to have talents for speaking equal to those for singing. But where is the man, whose bosom burns with a single spark of the love of nature, who could for a moment consent, that this sweet songster of the groves should barter away the touching wildness of its native notes for any thing that art has to bestow?

Yet, perhaps, there is no species among the class of birds that is more entitled to notice in a physiological survey, on account of its voice, than the *turdus polyglottus*, or mocking-bird. This is a subdivision of the thrush kind; its own natural note is delightfully musical and solemn; but, beyond this, it possesses an instinctive talent of imitating the note of every other kind of singing bird, and even the voice of every bird of prey, so exactly as to deceive the very kinds it attempts to mock. It is moreover playful enough to find amusement in the deception; and takes a pleasure in decoying smaller birds near it by mimicking their notes, when it frightens them almost to death, or drives them away with all speed, by pouring upon them the screams of such birds of prey as they most dread.

Now it is clear that the imitative, like the natural voice, has its seat in the cartilages and other moveable powers that form the larynx; for the great body of the trachea only gives measure to the sound, and renders it more or less copious in proportion to its volume. It is not therefore to be wondered at, that a similar sort of imitative power should be sometimes cultivated with success in the human larynx; and that we should occasionally meet with persons who, from long and dexterous practice, are able to copy the notes of almost all the singing-birds of the woods; or the sounds of other animals; and even to personate the different voices of orators and other public speakers.

One of the most extraordinary instances of this last kind, consists in the art of what is called VENTRILOQUISM, of which no very plausible explanation has hitherto been offered to the world. The practitioner of this occult art is well known to have a power of modifying his voice, in such a manner as to imitate the voices of different persons conversing at some distance from each other, and in very different tones. And hence, the first impression, which this ingenious trick or exhibition produced on the world, was that of the artist's possessing a double or triple larynx, the additional larynges being supposed to be seated still deeper in the chest than the lowermost of the two that belong to birds; whence, indeed, the name of VENTRILOQUISM or BELLY-SPEAKING. This rude and early idea M. Richerand was at one time strongly tempted to re-

vive ; but a closer examination of the subject convinced him, that it could not be supported, and he abandoned it, without, however, offering any other sufficiently matured for examination. Mr. Gough has attempted, in the Memoirs of the Manchester Society, to resolve the whole into the phænomena of echoes ; the ventriloquist, on this hypothesis, being conceived to confine himself on all occasions to a room well disposed for echoes in various parts of it, and merely to produce false voices by directing his natural voice in a straight line towards such echoing parts, instead of in a straight line towards the audience ; who, upon this view of the subject, are supposed to be artfully placed on one or both sides of the ventriloquist. It is sufficient, in opposition to this conjecture, to observe, that it does not account for the perfect quiescence of the mouth and cheeks of the performer while employing his feigned voices ; and that an adept in the art, like M. Fitzjames, who exhibited a few years ago in our own country, or M. Alexandre of the present day, is totally indifferent to the room in which he practises, and will readily allow another person to choose a room for him. Of M. Fitzjames, M. Richerand has given a particular account from personal examination. He observes, that he always made a strong inspiration before he commenced his performance, and could support his various voices till he required a fresh supply of air ; thus evidently proving, that the inhaled air was expired, though not through the lips, but, as appears from another case, observed by M. Richerand, at least partly through the nostrils.

Yet, the means, by which the ventriloquist is enabled to modify his articulations into the semblance of distinct voices, still remains to be explained ; and I shall hence beg leave to throw out a suggestion upon the subject. From various concurrent facts, ventriloquism appears to be an imitative art, founded on a close attention to the almost infinite variety of tones, articulations, and inflexions which the glottis is capable of producing in its own region alone, when long and dexterously practised upon ; and a skilful modification of these vocal sounds, thus limited to the glottis, into mimic speech, passed for the most part, and whenever necessary, through the cavity of the nostrils, instead of through the mouth. It is possible, however, though no opportunity has hitherto occurred of proving the fact by dissection, that those who learn this art with facility, and carry it to perfection, possess some peculiarity in the structure of the glottis, and particularly in respect to its muscles or cartilages.

In singing, every one knows that the glottis is the only organ made use of, except where the tones are not merely uttered but articulated. It is the only organ employed, as already observed, in the mock articulations of parrots, and other imitative birds ; it is the only organ of natural cries, constituting the language of all animals possessing a voice ; and hence Lord Monboddo has ingeniously conjectured, that it is the chief organ of articulate language in its rudest and most barbarous style. “ As all natural cries,” says he, “ even though modulated by music, are from the throat and larynx, or knot of the throat, *with little or no operation of the organs of the mouth*, it is natural to suppose, that the first languages were, for the greater part, *spoken from the throat* ; and that what consonants were used to vary the cries, were mostly

I. Vocal avenues.
Other modes of explanation.

Alike unsatisfactory.

Explanatory suggestions of the author.

Ventriloquism an imitative art.

Consisting of voice produced in the glottis alone.

Varied perhaps in the structure or number of its muscles or cartilages.

Glottis the only organ employed in singing ; and in the mock articulation of birds. Natural language of animals.

Glottis conjectured by Monboddo to have been the chief organ in the articulate language of man in a rude state.

I. Vocal
avenues.

Glottis capable
of supplying the
tongue's place.

This explan-
ation advanced
by the author
many years
ago.

A similar ex-
planation ad-
vanced since by
M. Magendie
with only a
slight variation.

guttural, and that the organs of the mouth would at first be but very little employed.* To which I may add, that notwithstanding, in the ordinary use of speech, the tongue takes an auxiliary part among mankind, yet the numerous and well authenticated examples on record, and to which we shall have occasion to advert more minutely hereafter, of persons who have retained a full and perfect command of speech, after the tongue has been destroyed or extirpated, proves, incontrovertibly, that the glottis alone is capable of supplying, in this respect, the place of the tongue, upon particular occasions, and where perhaps peculiar pains are taken to call forth the full extent of its latent powers.

This explanation, which some hundreds of persons in this metropolis may remember to have been advanced by the author, in a public lecture on the subject, delivered in the year 1811, has since been embraced in France, though without adopting the hint, that the full perfection of the art may possibly depend upon some slight addition to the muscular organism of the glottis, in those who are thus highly endowed with it. And hence M. Magendie asserts, that ventriloquism consists in nothing more than a delicate attention to the different effects or modifications of sounds or speech, thrown at different distances and through different modes of conveyance, and an exact imitation of them in a larynx of common formation and powers.

“ Les fondemens sur lesquels repose cet art sont faciles à saisir. Nous avons instinctivement reconnu, par l'expérience, que les sons s'altèrent par plusieurs causes; par exemple, qu'ils s'affoiblissent, deviennent moins distincts, et changent de timbre à mesure qu'ils s'éloignent de nous. Un homme est descendu au fond d'un puits; il veut parler aux personnes qui sont à l'ouverture: sa voix n'arrivera à leur oreille qu'avec des modifications dépendantes de la distance, de la forme du canal qu'elle a parcouru. Si donc une personne remarque bien ces modifications, et s'exerce à les reproduire, il produira des illusions d'acoustique, dont on ne pourra plus se défendre, qu'on ne peut pas voir les objets plus gros lorsqu'on les regarde à travers un verre grossissant; l'erreur sera complète s'il emploie d'ailleurs les prestiges convenables pour détourner l'attention.

“ Plus l'artiste aura de talens, plus les illusions seront nombreuses: mais il faut se garder de croire qu'un ventriloque produise les sons vocaux, et articule autrement qu'une autre personne. Sa voix se forme à la manière ordinaire. Sous un certain rapport, on peut dire que cet art est à l'oreille ce que la peinture est pour les yeux.”†

Single-objection
pointed out.

But this last view of an ordinary articulation and formation of the voice, is at variance with that perfect quiescence of the muscles of the cheeks and lips which the more skilful ventriloquists evince, and which can only be accounted for by a formation of articulations, and not merely a modification of sounds in the larynx.

II. Motive
powers.
Structure of
the lungs.

II. The lungs, whose vessels receive the air from the trachea, and in which the blood undergoes the important process of ventilation, are well known as a pair of large, light, elastic, and spongy

* *Orig. and Prog. of Lang.*, vol. i. b. iii. ch. 4.

† *Précis Élémentaire de Physiologie*, tom. ii. p. 235.

organs, suspended by the tracheal tubes and large blood-vessels in the cavity of the chest, and in size adapted to the two sacs of the pleura, which they completely fill when inflated. They are surrounded by an exquisitely fine duplicature of this delicate membrane, which lines the entire cavity of the thorax, and separates the lungs from each other by a process or septum; which, from its running between the two, is called mediastinum. [The same points of the two layers of the pleura are not always applied to each other; for when the lung expands, it slides upon the pleura costalis*; a fact proved by the elongation of the adhesions, so frequently existing between the lungs and inside of the chest.] The substance of the lungs is lobular; the larger lobes dividing into smaller, and the subdivision being continued through an almost infinite series, till the ultimate lobules terminate in very minute vesicles; which, after birth, though not antecedently, are filled with air, conveyed by an innumerable host of exquisitely slender ramifications from the two grand branches into which the trachea at first forks off, so as to form a main division for each of the lungs, and which are denominated bronchiæ, as their subdivisions are bronchial vessels. The vesicles or air-cells are invested and held in connection by the mucous web, common to all animal organs, which, at the same time that it unites them and forms their boundaries, opens a communication between the one and the other, and is itself freely supplied with exquisitely fine blood-vessels, that are ramifications from the pulmonary artery, and continue to divide and subdivide, till they at length form a beautiful net-work upon the sides of the air-cells, and ultimately become invisible from their attenuation; by which means every particle of blood is exposed, in its turn, to the full benefit, whatever this may consist in, of the gases of the atmosphere, contained in the air-cells which they thus surround.

II. Motive powers.

Air vesicles.

Bronchiæ.

[Magendie found the air-cells smaller in infants than adults, and less in adults than in persons of advanced age. It further appears that, as we grow older, the specific gravity of the lungs diminishes; and so remarkable is this change, that a piece of lung taken from a man sixty years of age, was fourteen times lighter than a portion of lung of equal size taken from a child.†

Different size of the air cells at different ages, and in health and disease.

This increase in the size of the air-cells is generally so regular, that the age of the subject may be determined by it. However, in old persons, who retain their *embonpoint*, whose muscles are large, and whose hearts are necessarily of considerable size, the air-cells do not undergo such an increase of dimensions. But the contrary happens in very thin old persons of broken constitutions, in whom the heart is almost always diminutive, and the quantity of blood scanty.

The size of the air-cells is also modified by disease. In individuals who have coughed a great deal previously to death, they are generally larger. When such persons are aged, the air-cells may be even two lines in diameter, without any vestige of laceration. The healthy lung of certain individuals, affected with phthisis on one side only, was found, when inflated and dried, to resemble light froth.

* See Mayo's Outlines, p. 85.

† Journ. de Physiol. Expér., t. i. p. 78—80.

II. Motive powers.

Effect in lessening the pulmonary capillaries.

The preceding change in the texture of the lungs with the progress of age, has the effect of really lessening the number of capillary vessels, by which the blood from the right ventricle is transmitted into the pulmonary veins. In other words, the surface by which the venous is converted into arterial blood, and from which pulmonary exhalation takes place, is thereby diminished. The only remedy for this imperfection would be a quicker pulse, in order that as much blood might be sent in a given time, through the lungs of an old, as through those of an adult subject. But unfortunately, as Magendie has observed, the heart beats more slowly in the aged, than in other individuals. From these facts, it seems probable, that the old person must consume less oxygen than the young; that his animal heat must be less; and his ability to resist cold very inferior.]

Division of moving powers.

The moving powers of the lungs consist in the bones, cartilages, and muscles by which they are encircled. The bones are the ribs and sternum, which, in their form, insertion, and general freedom of play (for even the sternum itself seems to yield a little), exhibit a perfection of art that the most careless among us cannot but admire, though the wisest could not have contrived:

Deus, Deus, ille, Menalca!

State of the lungs antecedent to birth.

Antecedently to birth, the whole of this machinery, with the blood-vessels, may be contemplated as at rest, and the lungs in a state of collapse, in whose interstices there is a perfect vacuum. From the moment the infant becomes exposed to the atmosphere, the air which presses forcibly on every side, presses also upon the upper part of the trachea through the channels of the mouth and the nostrils; the motive powers of expansion, and which are afterwards those of expiration, are immediately stimulated into action; the ribs rise by the agency of the intercostal muscles, and the chest becomes elevated; the diaphragm, whose broad and muscular septum divides the thorax from the abdomen, sinks, from instinctive sympathy, towards the viscera beneath, and the chest becomes deepened; and into the dilated vacuum, hereby produced, the external air rushes forcibly by the trachea, and, by inflating the lungs to the full stretch of their elasticity, compresses all the surrounding organs. Yet, as the force with which the air operates, is very considerably less than that of the heart when stimulated to contract, the blood, instead of being hereby impeded in its course through the pulmonary vessels, flows far more freely, and dilates these vessels by its plenitude, as they are already necessarily elongated by the expansion of the lungs; and the heart in this manner becomes liberated from a load, which, if it were to remain in its cavity, would oppress it, and put a stop to its action. And hence we behold at once the important connection that exists between the sanguiferous and the respiratory systems, and how much the soundness of the one must depend upon that of the other.

Inspiration, how produced.

Such, then, are the chief motive powers concerned in the act of inspiration, and the means by which they effect their purpose. The process of expiration, or that of throwing the air back again after it has accomplished its intention, is not of more difficult comprehension. [The muscular contraction of the diaphragm and intercostals having ceased, is succeeded by a short relaxation, the

Expiration, how produced.

elasticity of the cartilages of the ribs and texture of the lungs, occasionally aided by the muscles of the belly and loins, reduces the chest to its former dimensions; and as the capacity of the lungs is thus diminished, some of the air in them is expelled. In a little while, the contraction of the diaphragm and intercostals is renewed, and is again followed by relaxation: this alternative proceeding as long as life continues.]

Now this is precisely the state of the moving powers of the lungs, in the two alternate actions of inspiration and expiration. For while the muscles we have just adverted to are stimulated to expand the chest, there are others that, by a reverse energy, are perpetually striving to contract its diameter. Almost all the abdominal muscles tend to produce this effect, and particularly the oblique, straight, and transverse. Many of these are inserted into the ribs; and, as the latter become elevated, endeavour to draw them back into their anterior situations, to which also the ribs themselves have an inherent inclination to return, from their natural elasticity. Other muscles, urged into action by the descent of the diaphragm, immediately contract their fibres, diminish the convexity of the abdomen, and hereby force the abdominal viscera upwards and backwards against the diaphragm that thus intrudes upon them, and drive it into its former position: whilst all the blood-vessels, and even the air-cells of the lungs, possessing an elastic power, have a natural tendency to return to their smaller diameters; and hence expiration is performed with even more facility than inspiration, and is consequently the last action of dying persons.

The most important power in the act of expiration, is, unquestionably, the diaphragm: and on this account Dr. Carson, omitting all consideration of its auxiliary muscles, regards this as the sole antagonist to the expansive energy of the lungs. "Two powers," says he, "are therefore concerned in regulating the movements, and in varying the dimensions and form of the diaphragm, — the elasticity of the lungs, and the contractile power of the muscular fibres of the diaphragm. Of these powers, the one is permanent and equable; the other variable, and exerted at intervals. The contractile power of the diaphragm, when fully exerted, is evidently much stronger than its antagonist, the resiliency of the lungs; but the latter not being subject to exhaustion, takes advantage of the necessary relaxations of the former, and, rebounding like the stone of Sisypheus, recovers its lost ground, and renews the toil of its more powerful opponent." This is a correct statement, so far as it goes: but the collateral powers called into action in the expulsion of the air from the lungs, should not be overlooked in a general outline of the entire economy of respiration. In effect they are slightly hinted at, though not described, in the passage which immediately follows, in which we are told that "breathing is *in a great measure* the effect of this admirable contest between the elasticity of the lungs and the irritability of the diaphragm."*

II. Motive powers.

Antagonism of the moving powers in inspiration and expiration.

Action of diaphragm. Elasticity of the lungs.

[In ordinary breathing, expiration is conceived by some phy-

* Phil. Trans., 1820, p. 29. On the Elasticity of the Lungs. The above paragraph, marked for insertion in this work, was found amongst Dr. Good's MSS., subsequently to the publication of the last edition. — Ed.

II. Motive powers.

biologists to be, in a great measure, a passive operation, depending principally upon the elasticity and other physical properties of the organs concerned. This, however, is supposed to be the case only in the quiescent easy state of respiration, without exertion. Though the function cannot be altogether suspended by any voluntary effort, the degree in which it is carried on may be influenced and altered by the will. Thus, as Dr. Bostock notices, when we wish to make a full inspiration, we call into action, besides the diaphragm and intercostals, the external muscles of the breast, shoulders, and other neighbouring parts, which, by elevating the ribs and the sternum, increase still further the capacity of the chest. When, on the contrary, we wish to produce a full expiration, the abdominal muscles contract, the viscera are pushed up against the diaphragm, and its convexity towards the thorax is augmented.*]

Function accomplished chiefly without the interposition of the will.

Yet on emergencies the will controls and varies the action of the moving powers in respiration;

The powers I have thus far noticed, are those which usually act without the interposition of the will, although the will possesses some control over most of them. But whenever this faculty of the mind co-operates and throws its influence into the balance on either side, other powers are sometimes called into action, and the energy of some of these is occasionally suspended. Thus, in the case of a fractured rib, or of pleurisy, the power of the will keeps the ribs quiescent, and the power of expansion is thrown almost entirely upon the diaphragm; while, on the contrary, when, in running, a freer supply of air becomes necessary, and the heart palpitates from the rapidity with which the blood is thrown into it, the thorax is urged by the stimulus of the will to a quicker respiration, and the muscles that are inserted into the clavicles and scapulæ are often called upon for their conjoint assistance. And where the mind has, from an early period of life, been in the habit of exercising such a control, it is wonderful to contemplate the quantity of air which the lungs may be brought to inclose, and the length of interval through which the life may be preserved without a fresh supply: of which savage nations furnish us with striking examples, in the act of diving and remaining under water. Diemerbroeck relates the case of a pearl-diver, who, under his own eye, remained half an hour at a time under water, while pursuing his hunt for pearl muscles.†

and sometimes directs them to other purposes;

The will also makes use of the muscles of respiration for a variety of other purposes; sometimes for that of freeing the ærial passages themselves, or other cavities connected with them, from some material that irritates or loads them, as in coughing or sneezing, which actions are sonorous from the violence with which the air is protruded. Hiccup, which is a quick, convulsive contraction of the diaphragm, is generally exercised, even without the consent of the will. And sometimes the will employs these powers as mere expressions of mental feeling at the moment, as in laughing, sighing, or weeping: the first of which consists of a mere succession of short and abrupt expirations; and the last two, of deep inspirations, succeeded by deep expirations; broken, in the case of weeping, into a quick series of sonorous snatches; and often accompanied, in sighing, with deep and long-drawn intonations, which we call groans.

as in laughing, sighing, and weeping.

* See Bostock's Elements of Physiol., vol. ii. p. 8.

† Anatom., lib. ii. p. 464.

[Sir David Barry has endeavoured to demonstrate, that, in the ordinary process of respiration, the venous half of the circulating system derives considerable assistance from the action of the atmosphere on the cavity of the thorax. His experiments, as he conceives, establish the two following positions:

1st, That the cavities of the great veins within the thorax, and all the thoracic cavities, draw towards them the fluids with which they are placed in direct communication.

2dly, That this attraction, or suction, never takes place but during the expansion of the thorax, that is, during inspiration. And, from these facts, he deduces various inferences, amongst which only the two subsequent ones need here be noticed:

1st, That the blood, *which runs against its own gravity*, arrives at the heart only during inspiration.

2dly, That the power, which impels it at this moment through the veins, is atmospheric pressure.*

The nerves, whose influence is principally connected with the function of respiration, are the phrenic and par vagum. If the spinal chord be divided above the origin of the phrenic nerves, respiration suddenly ceases, but the action of the heart remains without any immediate change. If the same nerves be cut through in a living animal, the diaphragm becomes paralytic, and respiration is only imperfectly carried on by means of the muscles which raise and depress the ribs.

When the nervi vagi are divided in the middle of the neck, the breathing is instantly and seriously impeded, and death soon follows. This is supposed to depend upon the paralysis of the muscles, whose function is to open the glottis. In an ass, upon which this experiment had been performed, the breathing became easy as soon as an incision was made in the trachea. From Mr. Brodie's investigations †, it appears, that when the par vagum is divided, the quantity of carbonic acid produced by respiration is lessened. It is curious to learn, from the experiments of Dr. W. Philip, that the difficulty of breathing, caused by the annihilation of the nervous influence of the par vagum, may be temporarily removed by galvanism.]

III. But the most important part of the general economy of respiration consists in the change which takes place in the blood, in consequence of its being acted upon by the inspired air.

We see the blood conveyed to the lungs of a deep purple hue, and deprived of those qualities which fit it for nutrition, secretion, the preservation of the nervous influence, and the maintenance of the vigorous action of every part and organ; or immature and unassimilated to the nature of the system it is about to support, in consequence of its being received fresh from the trunk of the lacteals. We find it return from the lungs spirited with newness of life, perfect in its elaboration, more readily disposed to coagulate, and the dead purple hue transformed into a bright scarlet. What has the blood hereby lost? How has this wonderful change been accomplished?

II. Motive powers.

Effects of atmospheric pressure on the venous circulation in inspiration.

Influence of the phrenic nerves.

Influence of the par vagum.

III. Effect of respiration on the blood.

Character of the blood before it reaches the lungs.

Character afterwards.

* See Barry's Exp. Researches on the Influence of Atmospheric Pressure upon the Progression of the Blood in the Veins, &c. 8vo. Lond. 1826. p. 35. The objections made to these views by Drs. Good and Wedemeyer will be found in the third Physiological Proem of the present edition. — ED.

† Phil. Trans., vol. cii. p. 390.

III. Respiration.

The subject studied in former, as well as in modern times,

but still in an unsatisfactory state.

Average of inspirations in a minute, according to Davy.

Contents of inspired air :

of expired air.

Average frequency of respiration and the pulse.

Result.

Modena hue of the blood, how produced, according to Lavoisier.

Scarlet hue, how produced.

These are questions which have occupied the attention of physiologists in almost all ages, and were as eagerly studied in the Greek schools as in our own day. To the present hour, however, they have descended in a mantle of Cimmerian darkness; and though the researches of a more accurate chemistry have disclosed volumes of facts heretofore unknown, and the ingenuity of able theorists have laid hold of them, and applied them to an explanation of this curious subject in a great variety of hypotheses, I am afraid we are still almost as much at sea as ever; and that there is no inquiry in the whole range of physiology in a more unsatisfactory state, than that concerning the ventilation of the blood in the lungs.

According to a course of well-conducted experiments, instituted many years ago by Sir Humphry Davy, it appears, that the general sum of a man's natural inspirations are about twenty-six or twenty-seven in a minute; and that thirteen cubic inches of air are, in every inhalation, taken in, and about twelve and three quarters alternately thrown out. The atmospheric or inspired air was found to contain, in the thirteen cubic inches, nine and a half inches of nitrogen, three and four-tenths of oxygen, and one-tenth of an inch of carbonic acid; the twelve inches and three quarters of returned air gave nine and three-tenths of nitrogen, two and two-tenths of oxygen, and one and two-tenths of carbonic acid.

[Perhaps, in the foregoing statement, the quickness of ordinary respiration is exaggerated. Laennec says, that the breathing may be considered natural when the number of inspirations, in the state of repose, is from twelve to fifteen in a minute.* In the latest works on physiology, its frequency is said to vary between fourteen and twenty-seven times in a minute, but the average rate to be from seventeen to twenty.† In the healthy state of the system, Dr. Bostock‡ observes, that we respire, upon the average, about twenty times in a minute, while the average velocity of the pulse may be reckoned at eighty; and, consequently, the heart contracts four times during the completion of each movement of respiration. Laennec's estimate is probably the most correct.]

From the experiments of Sir Humphry Davy, therefore, there should seem to be a retention in the system of a large portion of the inspired oxygen, and a small portion of the inspired nitrogen; and a discharge from the system of a very considerable portion of carbonic acid gas. And as the colour of the blood is well known to be changed in its passage through the lungs, from a deep modena to a bright scarlet hue, M. Lavoisier, following up, with additional facts, an earlier set of experiments of Dr. Crawford, endeavoured to show, that, while the modena hue is produced by the carbon with which the blood is loaded when it first reaches the lungs, its scarlet results from its losing this surplus of carbon, and acquiring oxygen in its stead; during which process a very large quantity of caloric, or heat, in an elementary form, is supposed, also, to be disengaged from the air thrown into the air-cells of the lungs, and to pass into the adjoining minute blood-vessels in combination with the oxygen.

* Laennec on Diseases of the Chest, and on Mediate Auscultation, p. 13. Transl. by Dr. Forbes, ed. 2.

† See Mayo's Outlines, vol. i. p. 87.

‡ Element. Syst. of Physiology, vol. ii. p. 56.

[The quantity of oxygen lost by air that has been respired varies considerably, not only in the different kinds of animals, but in different animals of the same species, and even in the same animal at different times, according to the operation of certain external agents, and particular states of the constitution and functions. Under ordinary circumstances, a man consumes, on the average, about 45,000 cubic inches, or nearly 15,500 grs. of oxygen in twenty-four hours.*]

The experiments of Sir Humphry Davy were afterwards repeated by Pepys and Allen; but these acute analysts could not discover that any part of the inhaled nitrogen was retained; since the same exact proportion appeared from their trials to be thrown back in every instance of expiration, as had been previously received in every instance of inspiration. And there have since been doubts, on the part of Sir Humphry Davy himself, respecting the supposed caloric; not merely in regard to its separation from the atmospheric air, but as to its substantive existence at all, either there or elsewhere; heat being, in his later view of the subject, nothing more than a rapid, vibratory, or repulsive action of the corpuscles of a body that exhibits this phenomenon: thus reviving the doctrine of Aristotle and the Peripatetics, which was so ably controverted by the Epicureans, who, foretasting the spirit of the Lavoisierian system, strenuously contended that it was a substance *sui generis*.† While, to close the whole, Mr. Ellis has gone through another extensive range of inquiry, and instituted another numerous set of experiments, to prove that even the oxygen of the inspired air does not enter into the blood-vessels of the lungs, but becomes itself converted, in the air-cells of these organs, into the carbonic acid gas of the expired air, by uniting with the carbon of the blood, which he supposes, as a recement, to be secreted, in the form of a vapour, into the air-cells, by the exhalants of the lungs.‡ He admits, however, the existence of caloric, as an ele-

III. Respiration.

Doubts as to a retention of any part of the inhaled nitrogen.

Doubts as to the existence of caloric as a distinct substance:

thus reviving the controversy of the Peripatetics and the Epicureans.

Doubts as to the entrance of the inspired oxygen into the blood.

How disposed of according to Ellis, who admits the substantive existence of caloric; and ascribes to it the scarlet hue of the blood.

* See Bostock's Elements of Physiology, vol. ii. p. 110. Dr. Marshal Hall has inserted in the Phil. Trans. some very interesting remarks on the inverse ratio which subsists between respiration and irritability in the animal kingdom. He endeavours to prove, that the quantity of respiration is inversely as the degree of the irritability of the muscular fibre; or, in other terms, that in cases in which the quantity of respiration is great, the degree of irritability is low. By the quantity of respiration is signified the quantity of oxygen gas consumed, or exchanged for carbonic acid in a given time, by the animal placed in atmospheric air. Dr. Hall regards that muscle as the most irritable which, *ceteris paribus*, contracts most, and for the longest time, upon the application of the least degree of stimulus. According to his researches, respiration in the bird tribes and the mammalia is great, whilst the irritability of the muscular fibre is low. On the contrary, the reptiles, the batrachia, and the fish tribes, are endued with a high degree of irritability, but possess only an inferior quantity of respiration. As Dr. Hall observes, the quantity of respiration is greater in proportion as the animal occupies a higher station in the zoological scale, being among the vertebrated animals greatest of all in birds, and lowest in fishes: the mammalia, the reptiles, and the amphibia, occupy intermediate stations. The quantity of respiration is also remarkably low in the very young of certain birds, which are hatched without feathers; and of certain animals which are born blind; and in hybernation it is almost extinct. Dr. Marshal Hall's paper is exceedingly valuable, and his contrivance for measuring the quantity of respiration with minuteness particularly ingenious: it is named the *pneumatometer*. — En.

† See the Author's Translation of Lucretius. Note on book ii. v. 743.

‡ Inquiry into the Changes induced on Atmospheric Air, 8vo. 1807.

III. Respiration.

Chief facts and arguments in support of Ellis's hypothesis.

No proof of any aëriform fluid in the blood.

Reply to Ellis's objection.

mentary principle; conceives it to be disengaged in very large abundance, from the inspired air, during its union with the secreted carbonic halitus; and ascribes the recovered scarlet hue of the blood to its combination with this invisible fluid; as he does also whatever effects are produced by the exercise of the respiratory function, not merely in animals, but in plants.

Of the facts and arguments in favour of Mr. Ellis's hypothesis, which he extends to plants as well as to animals, the two following seem to be the chief. Firstly, the seeds of plants in germination, and plants themselves in growth, throw forth carbon in the form of aqueous vapour, or, in other words, dissolved in water, even where no oxygen is present.* And, secondly, such ejected fluid, wherever life exists, is the work of secretion. In consequence of which, he ventures to affirm that it is a secretion of this kind which is continually taking place on the surface of the lungs and of the skin, in animals, both which, he thinks, concur in a common action; and, in support of this opinion, he refers to various insects and worms, without stigmata or stemmata, which appear to breathe by the pores of the skin alone.

According to Mr. Ellis, we have no proof of carbonic acid, or of any aëriform fluid existing naturally in the blood†, and consequently have no reason to expect that any can be thrown out: while, if oxygen enter from the air-cells into the system, it must be by absorption, or chemical affinity. If by absorption, it would, in animals, take the regular course of the thoracic duct, and the blood in the right ventricle of the heart would first exhibit a scarlet hue; while, in the germination of vegetables, their seeds give no evidence of possessing a structure fitted to absorb and expel aëriform fluids; nor of any such fluids at any time existing in them.‡ To the operation of chemical affinity, he conceives an actual contact between the air and the blood to be requisite; but in the lungs we have an intervention of the coats of the cells, and of the blood-vessels. And, if these be presumed so thin that, when moist, they will allow the air, or its oxygen gas, to pervade them, the gas would rather pass into the interstices of the cellular substance, than into the pulmonary vessels, and thus create an emphysema. But the whole of such permeation he holds to be gratuitous, and contrary to experiment.§ The diminution in the bulk of respired air (calculated by Dr. Bostock to be on the average about $\frac{1}{80}$ of its bulk ||), he thinks, may be accounted for by an union of the carbon of the blood with the oxygen in the air-cells, and the formation of aqueous vapour by the disengagement of the caloric from the oxygen of the atmospheric air.¶

To these objections, however, it may be replied, that if caloric can penetrate animal membranes, and unite, by chemical affinity, with the blood in the blood-vessels, so, for any thing we know to the contrary, may oxygen. [Dr. Davy found that, in certain morbid conditions of the chest, the pleuræ had the power of

* Inquiry into the Changes induced on Atmospheric Air, 8vo. 1807. sect. 20. p. 23.

† Ibid., sect. 16. p. 18.

‡ Ibid., sect. 98. p. 122.

§ Ibid., sect. 101. p. 125.

|| Elem. Syst. of Physiol., vol. ii. p. 112.

¶ Inquiry into the Changes induced on Atmospheric Air, sect. 83. p. 99; sect. 107. p. 132.; and compare with sect. 11. p. 13.

absorbing, and probably of exhaling air; and such absorption extended likewise to air purposely introduced between these membranes in their healthy state. Hence he inferred, that mucous membranes may generally possess the power of absorbing and exhaling air; and that these operations naturally belong to the process of respiration.*] Mr. Porrett has shown, that the voltaic fluid, when operating upon water, is capable of carrying even water itself through the bladder, and raising it into a heap against the force of gravitation.† A like combination may take place between the voltaic or some similar fluid and the oxygen and a part of the nitrogen gases, in the air-cells of the lungs; and a similar permeation may follow directly through the membranes of the blood-vessels; and the carbon of the system may, in consequence, pass off by the same channel, instead of being secreted: and in the form of carbonic acid, instead of in that of carbonic vapour.

Next, we have no proof, that carbon will dissolve in water, and produce such vapour; and hence, at present, this idea is gratuitous.

Again, air appears, in various cases, to have been actually disengaged, and is, perhaps, perpetually disengaging from the blood. Mr. J. Hunter declares he has discovered it in an abscess, in which it could neither have been derived from without nor from putrefaction‡; and he hence adopted the opinion that air is often secreted by animal organs, or separated from the juices conveyed to them.§ And this opinion has not only been abundantly confirmed, but even extended to the vegetable world since his time; for Mr. Bauer appears to have shown, that an elastic gas is constantly shooting forth in small bubbles from the roots of plants into the slimy papulæ by which they are surrounded; and that it is hence the slimy matter becomes elongated, and is rendered vascular, or converted into hair or down. And Mr. Brande instituted experiments tending to prove, that carbonic acid does exist, and that, too, in a considerable quantity, in the blood of animals, while circulating through both arteries and veins; and that it is so largely poured forth from blood placed, while warm, under the receiver of an air-pump, as to give the appearance of effervescence; a fact familiar to Mr. Boyle nearly two centuries ago. The venous and arterial blood, according to Mr. Brande's experiments, seems to contain an equal proportion of this gas; and he calculated, that not less than two cubic inches were extricated from every ounce of blood thus experimented upon. And hence, Sir Everard Home, following up the discoveries of Mr. Bauer, ingeniously conjectures, that it is by the escape of bubbles of this gas from the serum of blood, in cases of effusion and coagulation, that new vessels are formed; as also granulations in pus, as a like gas appears to be separable from this latter fluid.||

[Dr. John Davy arrived, however, at a conclusion entirely differ-

III. Respiration.

Objections to several of his principles.

Facts seeming to show that air does exist naturally, both in animal and vegetable juices.

Experiments of Bauer.

Experiments of Brande.

Conjecture of Sir E. Home.

* Phil. Trans., 1823, p. 496.

† Thomson's Annals of Philosophy, No. 43. pp. 75, 76.

‡ Animal Economy, p. 207.

§ See various facts in confirmation of this view in Dr. Davy's "Observations and Experiments on Air found in the Pleura, &c." Phil. Trans., 1823, p. 496.

|| Phil. Trans. for 1818, p. 180.

III. Respiration.

ent from that of Mr. Brande, namely, that no free carbonic acid exists in the blood. In the spontaneous coagulation of this fluid, and in that of the serum by heat, he never observed carbonic acid to be disengaged; nor has he been able to procure carbonic acid gas from blood just taken from the vessels, still warm, and placed under a receiver, and completely exhausted of air. He states that he has raised the temperature of the blood and serum to blood-heat, and coagulated both by a heat of 200° Fahrenheit, without a particle of gas being extricated.* This discrepancy between philosophers of such eminence seems to demand a careful repetition of their experiments by others.]

Hence observations of Ellis not conclusive.

Later experiments of Gay Lussac and Magendie in favour of the Lavoisierian hypothesis.

Later and more accurate experiments of Edwards in confirmation of the views here offered.

After what has been stated, the observations of Mr. Ellis are by no means sufficient to subvert the Lavoisierian hypothesis of respiration. And some late experiments, both of Gay Lussac and of Magendie, tend to support those of Sir Humphry Davy, since they concur in proving that, in the act of respiration, there is a little more carbonic acid gas than oxygen consumed.

Since the first edition of this work was printed, the objections here offered to Mr. Ellis's conclusion, and the support thus attempted to be given to M. Lavoisier's hypothesis, have been amply and very plausibly supported by a new set of experiments, conducted with the utmost accuracy, and upon a far more extensive scale than ever, by Dr. Edwards of Paris, who is fairly entitled to be regarded as one of the clearest and ablest physiologists of the present day. [The doctrine, that the essential part of respiration is the union of the carbon of the blood with the oxygen of the atmospheric air, and the consequent formation of carbonic acid, implies that the carbonic acid produced in breathing is precisely equal to the volume of oxygen lost. Although this was maintained to be the fact by Allen, Pepys, Ellis, Magendie, and others, the experiments of Dr. Edwards may be considered as a decided refutation of the theory. According to this eminent physiologist, the excess of oxygen, consumed in respiration, above the volume of carbonic acid gas produced, varies from nearly one-third of the oxygen that disappears to almost nothing. The variation depends upon the species of the animal employed; upon its age, peculiarity of constitution, and condition at different periods.† Hence a different theory of respiration. Part of the oxygen that disappears may be absorbed in the lungs, and the remainder may either combine with the carbon of the blood, and form carbonic acid, or the whole of the oxygen may be absorbed, and the expired carbonic acid be a new secretion. The latter hypothesis is espoused by Dr. Edwards. When, in the month of March, frogs are immersed in pure hydrogen for eight hours, after all the air in their lungs has been pressed out, they continue to breathe, though less and less vigorously, and emit carbonic acid. The same fact was observed in kittens subjected to a similar experiment. A doubt has been suggested whether the carbonic acid came from the lungs, because it is exhaled when frogs are placed in hydrogen in the summer months, and breathe rarely, or not at all. It is also argued that, even supposing the carbonic acid were derived from the lungs in

* See Edin. Med. and Surg. Journal, No. 95.

† De l'Influence des Agens Physiques sur la Vie, &c. p. 418. Paris, 1824. 8vo.

these experiments, it may not be exhaled by the lungs in the natural state of respiration. On the whole, however, Dr. Edwards's views must be allowed to rest on facts, not readily admitting of any other interpretation than what he has given them.] The experiments of the same distinguished physiologist also prove, that nitrogen gas is exhaled, and likewise absorbed. The carbonic acid is sometimes equivalent to the oxygen which disappears, but sometimes also it is less; and the nitrogen gas exhaled is sometimes inferior, sometimes equal, and sometimes superior, to the quantity absorbed.

The quantity of air, inhaled in a single act of inspiration, is found to vary in persons of different-sized chests; but the aggregate, inhaled in a given period, does not essentially differ; since those who inhale most at a time make the fewest inspirations in a minute. I have said that Sir Humphry Davy calculated the average number of respirations in a minute at twenty-six or twenty-seven, and that the measure of air inspired or expired was estimated at about thirteen cubic inches each time. This breathing has since been supposed too rapid for a common standard, and the measure of air received and returned too low; but, as the former error compensates the latter, the amount of air does not essentially deviate from the general allowance for a minute. And it is by this explanation alone that we can in any way reconcile the different results which have been given by different experimenters upon this subject. Dr. Godwin calculated the inspired air at twelve cubic inches, and the expired at fourteen, being a difference produced by expansion from the heat of the lungs*; which does not essentially vary from the above estimate of Sir Humphry Davy; and he calculated the residuary air in the lungs, immediately after expiration, at one hundred and nine cubic inches, which, upon inspiration, was increased to one hundred and twenty-three. But Borelli states the inspired air at from fifteen to twenty cubic inches†; while Jurin, Haller, and Menzies give that which is expired at not less than forty.‡

In good health, perfect quiet, with an open chest, few persons, perhaps, are found to breathe more frequently than about twenty times in a minute; and the quantity inhaled and exhaled, at a temperature of fifty-five of Fahrenheit, is estimated at from twenty-six to thirty-two cubic inches each time; which, however, by the heat of the lungs, and saturated with moisture, become forty or forty-one cubic inches in the chest itself. Taking, then, twenty cubic inches as the ordinary quantity of external air inhaled and exhaled about twenty times in a minute, it will follow that a full-grown person respires twenty-four thousand cubic inches in an hour; or five hundred and seventy-six thousand cubic inches in the course of a day; a total equal to about thirty-nine hogsheads.

The quantity of carbon thrown out of the system of the lungs, when estimated in the gross, may afford matter of no less astonishment. For, taking the gravity of the carbonic acid gas as calculated by Lavoisier, a person in health must emit from his lungs something more than is equal to twelve ounces of solid car-

III. Respiration.

Quantity of inhaled air varies in different persons in a single inspiration, but not much in an aggregate period.

And hence the different results of different analysts are reconciled.

About twenty inspirations in a minute in quiet and sound health.

From twenty-six to thirty-two cubic inches each time: rendered forty or forty-one in the chest, when charged with heat and moisture.

Carbon emitted from the lungs equal to more than twelve ounces of charcoal every twenty-four hours.

* Connection of Life with Respiration, pp. 27. 37.

† De Motu Animal., p. 126.

‡ De Respirat., p. 32.

III. Respiration.

Primary cause of the red colour of the blood not yet settled.

Hypothesis of the French chemists.

Hypothesis of Davy.

Difficulties in both these, as well as in every other conjecture.

In respiration some other cause superadded, which changes the deep red of the veins into the scarlet of the arteries;

which has not yet been satisfactorily explained.

The deep red whether produced by the carbon of the blood? and the scarlet, by losing this material?

This may be true if the primary colouring matter be the iron of the blood, as suggested by Parmentier and Deyeux:

But not so if the primary colouring matter be the carbon itself, as suggested by Davy.

bon or charcoal, every twenty-four hours; or, according to another estimate, five thousand two hundred and eight grains.*

The primary cause of the red colour of the blood is a chemical, rather than a physiological question: and belongs to the sanguiferous, rather than to the respiratory function; yet, upon this point, also, physiologists are by no means agreed, some ascribing it to the conversion of the iron, which forms a constituent principle of the blood, into a red oxyde; and others, and particularly Sir Humphry Davy, to the affinity which the calorific rays of light have for oxygen generally, and hence, for the oxygen of the animal system; against the surface of which it is perpetually impinging, and into which it is perpetually carried in combination with the inspired air; separating it incessantly from its union with the carbon of the animal frame, and transforming the carbon, thus decomposed and simplified, into a dark pigment. But there are difficulties that hang about both these, and, indeed, every other hypothesis that has yet been started, concerning even the primary cause of the red colour of the blood, as we shall have occasion to notice more at large hereafter.

Yet, whatever may be the primary cause of the red colour of the blood, we find that, in respiration, there is some other cause superadded, and which, as observed above, heightens the colour the blood possesses at the time of its reaching the lungs, and converts it from a deep purple, or modena, into a rich scarlet. This M. Lavoisier, as we have already hinted, supposed to be produced by that supply of oxygen which he conceived it was the express object of respiration to communicate to the blood; and, in support of this view, a variety of experiments were appealed to, which seemed to show, that the colour of the blood becomes brighter whenever exposed to the action of oxygen. Yet, till all the objections of Mr. Ellis are satisfactorily removed, and those of Dr. Edwards are further confirmed, that oxygen in a free state is actually introduced from the air-cells of the lungs into the adjoining minute blood-vessels, we can place little dependence upon this explanation, however plausible and inviting.

But, may not the deepened colour of the blood be produced by the carbon, with which it becomes gradually loaded in the course of its circulation, and which, by the consent of all parties, is separated from it in the process of respiration? and, consequently, may it not recover its brightness by the mere loss of this dingy pigment, whether oxygen enter at the same time into the blood-vessels or not? If the primary colouring material of the blood be the iron which it contains, as first suggested by MM. Parmentier and Deyeux, and the carbon be a recrementory and adventitious material, this reply might be satisfactory; but if, as supposed by Sir Humphry Davy, the carbon of the blood be itself the pigment that colours it from the first, the explanation will content but very few. Yet this last hypothesis is as open to attack as any of the rest; for, to say nothing of the difficulty of conceiving how the carbon of the animal fluids can give a deep dye to the blood, while it gives no dye whatever to any of the fluids besides, it is sufficient to observe, that an abstraction of a part of this dye may, indeed,

* See Bostock's *Element. Syst. of Physiol.*, vol. ii. p. 111.

form a lighter hue of the same kind, but not a different hue. The hypothesis has yet to account for that yellow or orange tint, which must be added to the red venous blood before it can become changed into the red of the arterial; for, as a simple dilution of venous blood will not furnish this tint, so neither will a simple abstraction of the only colouring material which is hereby supposed.*

[In the consideration of the cause of the loss of the bright scarlet colour, one fact, pointed out by Mr. Hunter, merits particular notice, viz. that blood, when it is rendered stagnant in an artery by the effect of a ligature or the tourniquet, or in the cellular membrane by extravasation, assumes the purple colour of venous blood.† But, as Dr. Bostock properly remarks, even if Hunter's experiments, and certain others undertaken by Hassenfratz, were to be received as proofs, that the change of blood from the arterial to the venous state may be effected independently of any addition from without, it does not necessarily follow, that the reverse operation can happen in the same manner; nor, indeed, have we any evidence that it ever has been accomplished, without the intervention of oxygen.‡]

It may perhaps be said, that though oxygen do not get admission, caloric does; and this, too, very freely, and becomes itself the cause of this change of colour. And, in truth, this is the explanation offered by Mr. Ellis and various other physiologists; who contend that the function of respiration consists, firstly, in freeing the blood from its load of carbon, and, secondly, in introducing a very large portion of the matter of heat in its stead; thus far advocating the hypothesis of Dr. Crawford. And as a proof that caloric, as a substance, is separated from the inspired air, they appeal to the quantity of vapour that is formed in the vesicles of the lungs simultaneously with a formation of the carbonic acid, and which they ascribe to this cause; regarding the lungs as the great laboratory, in which the matter of heat or caloric is accumulated, and rendered fit for the use of the system.

But this, again, is to take for granted what yet remains an unsettled question, namely, whether caloric be a substance or a mere quality of body. Independently of which, admitting the substantive existence of caloric, and that some organ or other is specially employed in its evolution and introduction in a free state into the system, it is by no means established that this organ is the lungs; for Dr. Currie, in an ingenious paper, published some years ago, attempted to show, by various experiments, that this is chiefly effected by the action of the stomach, which was also the doctrine of Mr. Hunter. And Mr. Brodie has long since brought other experiments that seem to refer it to the action of the brain.§ Perhaps, however, all these and various other organs may co-operate to the same effect.

Much still remains to be ascertained upon this interesting subject. Even the recovery of the bright hue itself to the blood, by whatever means accomplished, and which by most physiologists is

III. Respiration.
This conjecture also objectionable.

Stagnant arterial blood acquires a purple colour.

Whether caloric be the cause of the change of colour :

and the lungs a laboratory for the accumulation of heat.

Requires proof.

The last function has been allotted to other organs.

Advantage immediately derived from the change of colour in the lungs not fully known.

* Some observations on this subject, by Dr. Stevens and Mr. Hoffman, will be referred to in the next Physiological Proem. — Ed.

† On the Blood, p. 65.

‡ Elem. Syst. of Physiol., vol. ii. p. 133.

§ Phil. Trans., 1812, p. 378.

III. Respiration.

Hence no set of experiments has led to any established doctrine upon the subject.

regarded as a fact of the utmost importance in the process of respiration, is contemplated by Mr. John Hunter as of scarcely any importance whatever, except as a proof that the blood has undergone the action of ventilation; an action which he conceives, from its being as necessary to white-blooded animals as to red-blooded, produces a far greater effect on the coagulating lymph than on the red particles.* And hence, though we have an abundance of facts and experiments upon the subject before us, and an abundance of speculation in respect to them, "the COMMERCIIUM MENTIS ET RERUM," as Lord Bacon has elegantly expressed it, has not hitherto led to any established doctrine, however creditable it has been to the industry and ingenuity of those who have engaged in it.

* On Blood, pp. 204—206, &c.

CLASS II.

PNEUMATICA.

ORDER I.

PHONICA.

AFFECTING THE VOCAL AVENUES.

THE term PHONICA (ΦΩΝΙΚΑ) is sufficiently explained in the definition. The order of diseases, which it is intended to comprehend, are seldom dangerous or acutely painful; and are rather characterized by trenching upon the grace or utility of the voice, than undermining the general health. It embraces the following

CLASS II.
ORD. I.

GENERA.

| | |
|-----------------|-------------------------|
| I. CORYZA. | RUNNING AT THE NOSE. |
| II. POLYPUS. | POLYPUS. |
| III. RHONCHUS. | RATTLING AT THE THROAT. |
| IV. APHONIA. | SPEECHLESSNESS. |
| V. DYSPHONIA. | DISSONANT VOICE. |
| VI. PSELLISMUS. | DISSONANT SPEECH. |

GENUS I.

CORYZA.

RUNNING AT THE NOSE.

DEFLUXION FROM THE NOSTRILS OBSTRUCTING THEIR CHANNEL.

IN the commentary to the nosological text, I have ventured to point out what seems to be the real origin of the term coryza, concerning which the Greek lexicographers are at a loss; and have shown it to be a genuine and very extensive as well as very ancient Oriental term, common, under some modification or other, to the Hebrew, Arabic, Chaldee, and Syriac dialects, from one of which

GEN. I.
Origin of the
generic term.

GEN. I.
How used by
Hippocrates :
by the later
Greek phy-
sicians :
by modern
writers.
The last sense
confused and
indefinite.
Should import
an idiopathic
affection.

it was doubtless imported into the Greek tongue. By Hippocrates it was used in a very extensive sense, so as to signify defluxion of any kind, whether from the head, nostrils, fauces, or chest. The later Greek physicians restrained coryza to a defluxion from the head and nostrils, and applied the term *catastagnus* to a defluxion from the fauces and thorax. Among modern writers, at least since the time of Cullen, coryza is used synonymously with catarrh, and is consequently regarded as a febrile affection. But this is rather to confound morbid affections, than to simplify them. Coryza, running, defluxion or distillation from the nose, may indeed occur as a symptom in catarrh, as it may also in various other complaints, as the measles and some species of ophthalmy; but it may also occur, and as a simple and idiopathic affection does occur, without febrile action of any kind. In which cases, indeed, it is of little importance, and not often worthy of medical interposition: yet, in a general system of morbid affections, it ought no more to be passed by unnoticed, than a hedge or bog plant in a system of botany.

Coryza.

Simple defluxion from the nostrils may proceed from two very different states of body, or of local power in the organs affected; which furnish us with two distinct species of affection, characterized by sufficiently marked and discrepant symptoms:—

- | | |
|---------------------|-----------------|
| 1. CORYZA ENTONICA. | ENTONIC CORYZA. |
| 2. CORYZA ATONICA. | ATONIC CORYZA. |

SPECIES I.

CORYZA ENTONICA.

ENTONIC CORYZA.

THE DEFULXION PELLUCID, MUCOUS, OR ROPY; WITH A SENSE OF IRRITATION OR INFARCTION.

GEN. I.
SPEC. I.
Secernent ac-
tion increased :
absorbent
diminished.
Symptoms vary
from difference
of stimulants.

In this species, there will always be found an increased action of the secernent emunctories of the nostrils, while the absorbents remain little disturbed in their function; and as a morbid diminution of active power is ordinarily expressed by the terms atony and atonic, so entony and entonic are in the present work employed to express the opposite, or a morbid excess of activity. According to the difference of the stimuli, or accidental causes by which the present affection is produced, there will be some difference in the symptoms: for these causes may be, sternutatories; the irritation of continuous sympathy, as in crying or weeping; a damp chill, or some other change produced suddenly in the temperature, or perhaps temperament, of the atmosphere. And it is still more generally, and often with great abruptness, brought on by a transfer of action, or a sort of reverse sympathy with some remote organ.

Thus, there are many persons, who, as Dr. Darwin observes*, by sleeping at night with their arms or shoulders accidentally uncovered, become cold and torpid in the cutaneous vessels of these organs, and have their nostrils instantly affected with increased action, filled with mucus, and so thickened in the mucous membrane as to render them almost incapable of breathing.

An ozæna or nasal ulcer will also frequently produce a like effect: in which case, the increased defluxion will be intermixed with a purulent or ichorous matter, sometimes throwing forth an offensive smell: all which may be arranged in a tabular form under the following varieties:—

| | |
|------------------------------|--|
| α Sternutatoria. | From sternutatories: accompanied with sneezing. |
| β Lachrymosa. Snivelling. | From weeping or crying: the lachrymal secretion being increased by mental emotion. |
| γ Catarrhalis. Snuffling. | From sudden chill or moisture in the temperature or temperament of the atmosphere. |
| δ Ozænosa. | The defluxion more or less purulent; or ichorous and fetid. |

The last is a case of surgical rather than of medical treatment, and is often connected with a caries of the ossa spongiosa, or ossa nasi, and frequently with a lodgment of pus in the frontal sinus or antrum maxillare; in both which cases, the inflammation is at times accompanied with excruciating pain. The first is peculiarly common to grazing animals, and especially to sheep, from the irritation of minute insects, and especially those of the gad-fly, whose eggs have been deposited in the upper part of the nostrils by the impregnated female.

From the dryness of the mucous membrane of the nostrils in India, the common coryza is peculiarly frequent under the name of *naukera*. The natives cure it in its onset by topical bleeding: for which purpose, they prick the inflamed membrane with a sharp-edged grass, which answers the purpose of a lancet, and soon relieves the pain by the flow of blood which ensues.†

A warm atmosphere easily, and in a short time, takes off the variety produced by a sudden application of cold, or a sudden change in the temperament of the atmosphere, and which makes an approach towards a catarrh, though without any sense of heaviness or oppression in the head, or harshness in the fauces. From the obstruction of the nostrils, however, there is usually a nasal voice and a deficiency or loss of smell; and, where the discharge is acrid, an excoriation of the mucous or Schneiderian membrane. When it is the result of a reverse sympathy with the arms or other limbs, rendered chilly at night by being uncovered, it is easily and almost instantly removed by covering the chilly organs with additional bedclothes, and thus restoring the balance of heat and cutaneous secretion.

GEN. I.
SPEC. I.
Coryza entonica.

General remarks respecting the cure.
Progress and modifications.

Treatment.

* Zoonom., Cl. I. Ord. I. ii. 7.

† Miscellaneous Obs. on certain Indigenous Customs, &c. in India, by Daniel Johnson.

GEN. I.
SPEC. I.
Coryza en-
tonica.
Singularity of
cause and
effect.

In a singular idiosyncrasy, reported in the Ephemera of Natural Curiosities, the odour of roses, without amounting to a sternutatory, proved a stimulus sufficient to excite a coryza whenever applied.* It is well remarked by Galen, that various foods produce a like effect †; and Bonet, in one instance, found it occasioned by a globular tumour, surrounded by a fluid in the ventricles of the brain ‡, probably from an excitement of the olfactory nerves, which take their rise in the corpora striata, situated in this quarter of the cerebrum.

SPECIES II.
CORYZA ATONICA.
ATONIC CORYZA.

THE DEFLUXION LIMPID, AND WITHOUT ACRIMONY OR SENSE OF IRRITATION.

GEN. I.
SPEC. II.

THE chief causes are, exposure to a keen frosty air; the natural paresis of old age; and a long and immoderate use of strong aromatics, volatile alkali, or snuff; affording the three following varieties:—

- | | |
|--------------|---|
| α Algida. | From exposure to a keen frosty air. |
| β Senilis. | From old age. |
| γ Superacta. | From habitual indulgence in snuff, or nasal stimulants. |

Diminished
action in both
secernents and
absorbents.

Treatment of
the first variety,

as distinguished
from the pre-
ceding species.

In all these, there is diminished action in both the secernent and absorbent vessels of the nostrils, but chiefly in the latter, which almost uniformly yield soonest, from causes we shall hereafter have to explain. And hence, while the secernents are only capable of separating a thin limpid water, instead of a viscid mucus, the absorbents are too inert to carry off even this, which in consequence accumulates, and drips from the nostrils. A warm atmosphere, or the vapour of warm water snuffed up the nostrils, affords an easy remedy for the first variety of this species, which far more frequently occurs, and perhaps only occurs, in a dry, sharp, frosty air, than in an atmosphere rendered chilly from damp; damp being, as already noticed, rather a cause of the preceding species. In the former case, the severity of the cold overcomes all power of reaction; and hence, notwithstanding there is a defluxion, because whatever is secreted is not carried off by the correspondent absorbents, the discharge is checked in its quantity, at the same time that it is rendered more limpid. In the latter case, the tone

* Dec. ii. Ann. v. Obs. 22.
† Fragment. ex Aphor. Rabi Moyses, p. 36.
‡ Sepulchr. Lib. I. sect. xvii. Obs. 10.

of the excretories rises superior to the chill to which they are exposed, and the reaction ascends to something of a morbid excess. A warm room, and particularly the excitement of a gentle perspiration, will cure both; but the first is also often cured by brisk walking, or any other vigorous exercise proportioned to the sharpness of the frost; for, as the system becomes roused generally, the nasal excretories become roused also, and triumph over the cold with a reactive power, which is at the same time communicated to the correspondent absorbents, when the defluxion immediately ceases.

The two last varieties are beyond the reach of medical aid. The coryza, or snuffling of old age, is precisely analogous to its ptyalism or drivelling. In the one, the atony is seated in the excretories of the salivary glands; in the other, in those of the mucous membrane of the nostrils. Among the habitual irritants that lead to the same effect, snuffs are the worst: for the tobacco of which they consist operates with the mischief of a narcotic as well as of a stimulant; and hence the copious and foul secretion with which the nostrils of aged snuff-takers are constantly deformed.

GEN. I.
SPEC. II.
Coryza
atonica.

Two last varieties without remedy.

GENUS II.

POLYPUS.

POLYPUS.

FLESHY, ELONGATED EXCRESCENCE, GENERALLY SHOOTING FROM A COMPARATIVELY SLENDER ROOT ATTACHED TO SOME PART OF THE MUCOUS MEMBRANE OF THE NOSTRILS; EXTENDING IN DIFFERENT DIRECTIONS, AND AFFECTING THE SPEECH.

THIS is the polypus, properly so called, and the disease to which the term is applied by Celsus, and continued to be applied till after the days of Heister, who uses it in the same restricted sense. More lately, however, the term polypus has been employed in a much looser signification, and made to import concretions and excrescences appearing in various channels or cavities of the body, of very different origins and textures, as those of the heart; those of the uterus and bladder, which are caruncles or sarcophytes, with a slender base or peduncle; and those of the trachea in croup, which are concrete gluten; whence the croup is by such writers denominated *angina polypus* or *polyposa*.

It is better, with the old authors, to restrain polypus, as a distinct generic term, to peduncular excrescences in the nostrils, and to distinguish by the phrase polypous tumours, caruncles, or shoots, such adscititious productions as may have a resemblance to them in other organs.*

GEN. II.
Generic term
used in the
present sense
formerly:

but indefinitely
in later times.

What ought to
be the distinction.

* Polypi are now regarded, as growths, peculiar to mucous membranes, or surfaces; and as these exist in various parts of the body, so must polypi also present themselves in different situations. — ED.

GEN. II.
Polypus.

Polypus, in the above limited sense, comprises two species, from the very different texture under which it is found.

- | | |
|-----------------------|------------------------|
| 1. POLYPUS ELASTICUS. | COMPRESSIBLE POLYPUS. |
| 2. ——— CORIACEUS. | CARTILAGINOUS POLYPUS. |

SPECIES I.

POLYPUS ELASTICUS.

COMPRESSIBLE POLYPUS.

SOFT, COMPRESSIBLE, UNACHING, CHIEFLY PALE-RED; APPARENTLY ORIGINATING FROM DISTENTION, OR RELAXATION OF THE SCHNEIDERIAN MEMBRANE.

GEN. II.
SPEC. I.
Affected by the atmosphere.
Little painful.

May be easily restrained in an incipient state.
Afterwards should be extirpated.

THIS species is very apt to be affected by the state of the atmosphere; being often retracted and shrivelled in dry weather, and enormously enlarged and elongated in thick, hazy weather. There is little pain during any stage of its progress, however troublesome it may be to deglutition or the voice. [The most common variety of the compressible polypus is that which bears, in consistence, shape, colour, and size, a striking similitude to the common oyster.*] If attended to when small, or in an incipient state, it may often be prevented from growing large by the use of astringent applications; as a strong solution of alum, a decoction of oak-bark, or the application of vinegar or brandy. But where the excrescence becomes inconvenient from its bulk, it ought to be instantly extirpated. When timely attendance is not paid to it, and especially in unhealthy habits, it sometimes assumes a scirrhus character, and at length is apt to bleed with great freedom, sloughs, and ultimately produces, from its increased size and malignity, a horrible disfigurement of the face, and renders life most pitiously distressing. And where it does not become strictly cancerous, it degenerates into a fungous ulceration, nearly as much to be dreaded.†

[Experience proves, that extraction, with a suitable kind of forceps, is generally the best method of extirpating nasal polypi. In a very few instances, other plans are allowable. Thus, in one case, under the care of Mr. Robertson, of Kelso, the size of the polypus rendered the introduction of a pair of forceps, or a ligature, impracticable. Hence, an incision was made through the nose on the affected side, and the mass of the polypus brought into view. Two ligatures were passed through it; but its magnitude was such,

* See Gibson's Institutes and Practice of Surgery, vol. ii. p. 296. Philadelphia, 1825.

† Lectures of Sir Astley Cooper, Bart., with additional Notes, &c. by F. Tyrrell, Esq. vol. i. pp. 354, 355. 8vo. 1825. Whether the soft compressible polypus, originally of a benign character, ever becomes one partaking of a cancerous nature, or rather of the character of fungus hæmatodes, may be doubted. — Ed.

that its root could not be reached. By perseverance; however, so much of the tumour was cut away, with the aid of the ligature, that Mr. Robertson at length succeeded in detaching the root with the point of his finger.*]

GEN. II.
SPEC. I.
Polypus
elasticus.

SPECIES II.

POLYPUS CORIACEUS.

CARTILAGINOUS POLYPUS.

FIRM, CARTILAGINOUS, OFTEN PAINFUL, CHIEFLY DEEP-RED;
APPARENTLY ORIGINATING FROM, OR CONNECTED WITH, A
CARIES OF THE ETHMOID BONE.

THIS species is not only painful, but, from being firm and deep-seated, very troublesome in removal. It is not always, indeed, that it can be extirpated entire, or that it is advisable to extirpate it when possible. When extracted imperfectly, it is very apt to regenerate, and has sometimes become cancerous.

GEN. II.
SPEC. II.
Painful from
an early stage.

It is too generally believed, however, that polypi in all instances may and ought to be extracted; and that, if the shoot can be laid hold of by the forceps, and we are not afraid of any hemorrhage, nothing is to be dreaded from the operation. Mr. Pott was of a different opinion: he had observed many cases, which, though neither scirrhus nor cancerous, were very unfit for any surgical process. Some circumstances, he remarks, may forbid the attempt, from the impossibility of its being successful; others, from its being more likely to increase and exasperate the disease than to cure it. He dissuades from the operation in almost every instance of the second or coriaceous species; in all those cases, in which the polypus begins with considerable pain in the forehead and upper part of the nose, or is preceded by these symptoms; and which, as soon as it can be seen, is either highly red, or of a dark colour; which is never alternately smaller and larger, but rather progressively increasing: in which the common actions of coughing, sneezing, or blowing the nose, give pain, or produce a very disagreeable sensation in the nostril and forehead; in all cases of polypi, which, when within reach, are painful to the touch, or which, upon being touched slightly, are apt to bleed; those which do not seem to be moveable by the action of blowing the nose, or driving the air through the affected nostril only, when confined to one side; those which are incompressibly hard, and, when pressed, occasion pain in the corner of the eye, or in the forehead, and which, if they discharge any thing, shed blood; those which, by adhesion, occupy a very considerable space, and seem to consist of a thickening or an enlargement of the membrane covering the septum

When extracted,
apt to regenerate.

Ought not to
be extracted
universally.

Circumstances
unfriendly to
the operation
according to
Pott.

* Edin. Med. Journ., No. 90. p. 44. Graefe has invented some most ingenious contrivances for tying polypi in the nostrils, as well as other situations. These instruments are constructed and sold by Mr. Weiss, of the Strand. — ED.

GEN. II.
SPEC. II.
Polypus
coriaceus.

narium; those from which there is a discharge of an ulcerous, offensive, discoloured fluid; and those round the lower part of which, within the nose, a probe cannot easily and freely be passed to some height. In all cases thus characterized, Mr. Pott was of opinion, that no trial should be made by the forceps; and he advised further, that no attempt to remove them should be made by any other means, with which he had the good fortune to be acquainted.

Circumstances
favourable to a
removal of the
excrecence.

But where these characters do not occur, and, in general, where the polypus answers to the first species in elasticity and colour, he recommends its removal, and by the forceps rather than by escharotics, ligature, or any other means; and thinks it may be extracted with great safety.*

GENUS III.

RHONCHUS.

RATTLING IN THE THROAT.

HARSH, SONOROUS BREATHING FROM STAGNATION OF MUCUS IN THE VOCAL CANAL.

GEN. III.
How far
idiopathic,

THERE are two species of morbid affection, which may be arranged under this genus, each of which has been raised to the rank of a distinct genus by Vogel and several other nosologists; while by Cullen, and those who have followed him, they have been entirely struck out of the catalogue of morbid affections, as either unworthy of notice, or merely symptomatic of some other complaint.

and entitled to
a distinct
notice.

To a generic distinction they are scarcely entitled; but a slight acquaintance with the habits and morbid actions of the system is sufficient to afford instances in which both sorts are idiopathic. Many persons have a thick or wheezy respiration, produced by corpulency, or by changes of the atmosphere, from hot to cold, or from dry to moist, without any other disease. Many persons snore habitually during sleep; and most persons have a tendency to do so as they grow old. Under such circumstances, the affections before us are strictly idiopathic. They are not often indeed accompanied with much inconvenience; but, as deviations from a perfect state of health, they have a full claim to their respective places in a general system of nosology. Confervas in botany, and infusory worms in natural history, are as confessedly objects of scientific arrangement and study, as the oak and the elephant.

* *Chirurgical Obs. relative to the Cataract, Polypus of the Nose, &c.* 8vo. Lond. 1774. The most common malignant polypus of the nose, is now generally believed to be of the nature of fungus hæmatodes, or medullary sarcoma, to which the surgeon cannot usefully apply any operation in this situation. Palliative treatment is all that can be adopted. — Ed.

The two species, then, appertaining to the present genus, are the following : —

GEN. III.
Rhonchus.

1. RHONCHUS STERTOR.

SNORING.

2. ————— CERCHNUS.

WHEEZING.

M. Laennec has increased the subdivisions of rhonchus, or, as he calls it, *râle*, to five ; and as modified by a variety of primary diseases of the chest, they may easily be extended to this number ; but then they become mere symptoms, and not idiopathic affections. “For want,” says he, “of a better, or more generic term, I use the word *râle*, *rattle*, or *rhonchus*, to express all the sounds, besides those of health, which the act of respiration occasions, by the passage of the air through fluids in the bronchiæ, or lungs, or by its transmission through any of the air-passages partially contracted.” He distinguishes five principal kinds of rattle :—1. The moist crepitous. 2. The mucous, or guggling. 3. The dry sonorous. 4. The dry sibilous, or hissing. 5. The dry crepitous, with large bubbles, or crackling.*

Subdivisions of
Laennec.

SPECIES I.

RHONCHUS STERTOR.

SNORING.

THE SOUND DEEP AND LOUD ; PRODUCED IN THE LARYNX AND FAUCES.

As a symptom, this is common to apoplexy ; but, as I have just observed, it is found idiopathically in many instances, brought on by advancing age, or peculiar to the habit. A syrup, made of the leaves of the *erysimum officinale*, or hedge-mustard, was for this kind of noisy breathing once popular ; and the pungency of the plant may often prove useful. The common cause is here, a lodgment of the tougher and denser part of the mucous secretion of the larynx and fauces in these passages.

GEN. III.
SPEC. I.
General
remarks.

In some cases, as in the atonic coryza of age, the excretories of these organs may be permanently relaxed, so as to admit of a larger defluxion, than in health and vigour. And hence, local stimulants are particularly applicable ; among the best of which may be ranked camphor, and other terebinthinate medicines, gum ammonia, and the alliacea.

* De l'Auscultation Médiate, ou Traité du Diagnostique des Maladies des Poumons et du Cœur, &c. par R. T. H. Laennec, &c. 2 tomes. Paris, 1819 ; and translation, with Notes, by Dr. Forbes, 2d edit. p. 49.

SPECIES II.

RHONCHUS CERCHNUS.

WHEEZING.

THE SOUND DENSE AND IMPEDED; PRODUCED BELOW THE LARYNX.

GEN. III.
SPEC. II.
Pathology.

THIS affection, as a symptom, is common to asthma and dyspnœa; but, as I have already observed, it is sometimes found as a primary evil, or independent of any other complaint. In the introductory dissertation to the present class, we remarked, that a considerable quantity of aqueous vapour is formed in the air-cells of the lungs during the process of respiration; supposed, by the physiologists who contend for the inhalation of caloric as a distinct substance, to be produced by its separation from the inspired air of the atmosphere, and the union of a part of its oxygen with the hydrogen furnished by the lungs. In health, this vapour is very freely exhaled by the mouth, and forms that mist, which is seen to issue from every man's lips in frosty weather, and especially when thrown upon a dark polished surface, as that of a mirror. But, if the bronchial vessels be obstructed by a more than ordinary increase or accumulation of mucus, it escapes with difficulty; and, encountering the air that is thrown into the lungs, occasions that hissing or wheezing sound, which is always produced by a current of air when it has to force its passage through a body of dense vapour. Commonly, therefore, this is a case of atony, local or general; and, like the last species, will be best relieved by those medicines that gently stimulate, and warm, and give power to the bronchial lymphatics, as the resinous gums, and the bulbs of the alliaceous plants. In fat people, and especially those who are low of stature, short-necked, and oppressed with fat about the chest, the obstruction is chiefly the result of infarction and pressure; for the diaphragm and other muscles, not having full play, the lungs are never thoroughly expanded, and the extricated vapour is put into a smaller space, and has a narrower exit. And here the only cure must consist in taking off the obesity by repeated venesections, active purgatives, vigorous exercise, and a low diet.

Ordinarily a
result of atony,
and relieved by
tonics and
stimulants.
Sometimes a
result of
obesity;

and cured by
lowering the
system.

GENUS IV.

APHONIA.

DUMBNESS. SPEECHLESSNESS.

INABILITY OF SPEECH.

WE now proceed to a group of diseases that affect not so much the trachea or general avenue of sound, as the organs of articulation fixed on its upper end, like a capital upon a pillar, as M. Blumenbach has elegantly observed, and consequently which impede or vitiate the power of speech. These have been very differently arranged by different writers, and have often been very unnecessarily extended and complicated, especially by Vogel, as may be seen by a reference to the commentary in the author's volume on Nosology. Upon the whole, they will be found to distribute themselves most easily and distinctly under the three following generic divisions:—Defects that depend on an utter inability of speech; those in which the sound of the voice is imperfect or depraved; and those in which, while the sound of the voice continues unaffected, the articulation is incorrect or vitiated. It is the first of these divisions that constitutes the genus before us.

GEN. IV.
General
remarks.

Inability of speech may proceed from three different causes, each of which lays a foundation for several symptoms peculiar to itself, and consequently for the three following species:—

- | | |
|-----------------------|--------------------|
| 1. APHONIA ELINGUIUM. | ELINGUAL DUMBNESS. |
| 2. ——— ATONICA. | ATONIC DUMBNESS. |
| 3. ——— SURDORUM. | DEAF-DUMBNESS. |

SPECIES I.

APHONIA ELINGUIUM.

ELINGUAL DUMBNESS.

SPEECHLESSNESS FROM DESTITUTION OF TONGUE.

THIS may be of two sorts; each of which lays a foundation for very different results:—

GEN. IV.
SPEC. I.

- | | |
|--------------|--|
| α Congenita. | The defect coeval with the birth. |
| β Oblæsa. | The defect produced by accident, punishment, or disease. |

GEN. IV.

SPEC. I.

Aphonia
elinguium.

Power of the
glottis com-
pared with that
of the tongue.

Hence those
without a
tongue, for the
most part
dumb.

Yet not always,
since the glottis
or other organs
sometimes
supply its
place;

as in ventrilo-
quism,

and still more
so in some
persons whose
tongue has
been extirpated.

Such accounts
unjustly dis-
credited,

when well sup-
ported by evi-
dence.

Illustrated
from recent
examples.

Case examined
by the univer-
sity of Saumur.

The glottis is the chief organ employed in dividing the voice into distinct or simple tones or notes; as the tongue chiefly divides it, either singly, or by a co-operation with other organs, into distinct articulations, so as to form proper language, which is hence commonly regarded as nothing more than a modification of the powers of the *lingua*, as the *tongue* is called in Latin; and hence *tongue* and *language* are often used synonymously. It is obvious, therefore, that, in all common cases, the man who is deprived of his tongue, whether by congenital defect, by mechanical force, or by disease, must at the same time be deprived of the power of speech, and become dumb.

I say in all common cases; for a privation of the tongue is not always accompanied with dumbness. It is not necessarily so in all cases of congenital destitution, and still less in all cases of privation that occur after speech has been acquired. In the Physiological Proem to the present Class, we had occasion to remark, that the glottis alone, in some instances, either from a greater pliancy and volubility of the muscles proper to it, or from the possession of some superadded muscle or membrane, seems to have a power of forming distinct articulations without the assistance of the tongue: and I hence endeavoured to account for that singular talent, which we denominate ventriloquism. But there is a more singular talent still, that sometimes occurs in the history of the human voice, and which is probably resolvable into the same cause; for we have examples, supported by indisputable authentication, of persons, who, having lost the entire organ of the tongue, and a few of them of the uvula also, have still retained a power of speaking, and even of expressing themselves with a clear and accurate enunciation. Such examples, indeed, are not very common; but they seem to have occurred in all ages, and especially when it was the barbarous custom among the Turks, Goths, and other half-civilized nations, to cut out the tongues of the unhappy wretches, whom the chance of war had thrown into their hands as prisoners.

Some persons profess to disbelieve all the stories of this kind, for the mere reason that they have never witnessed any thing of the same kind in their own age or country. But such persons would have also joined the king of Siam in disbelieving the Dutch ambassador's assertion, that the rivers in his own country became so hard and solid during the winter, that men and women could walk and skate upon them. The accounts are too numerous, and in many instances too well supported, to be treated with scepticism; and all that is left to our judgment and ingenuity is not to deny the evidence, but to account, as we shall presently proceed to do, for the fact.

Hundreds of cases might be quoted upon this subject; but the following may be sufficient, though others are referred to in the nosological system, which may be examined at the reader's leisure. Those now selected are taken from recent times, and from authorities that may indeed be disbelieved, but cannot be disputed.

In the third volume of the *Ephemerides Germanicæ*, we have the history of a boy, who, at eight years of age, lost the whole organ of the tongue, in consequence of a sphacelus proceeding from the small-pox, and who was able to talk after its separation. The boy was exhibited publicly, but a trick was generally sus-

pected; in consequence of which the boy and his friends were summoned to appear in court before the members of the celebrated university of Saumur. In the presence of this learned body, he underwent a strict examination as to the loss he had sustained, and the lingual powers he still possessed. The report was found correct; and the university, in consequence, gave their official attestation to the fact, in order, as it expressly asserts in its records, that its reality might not be called in question in succeeding times.

In the *Mémoires de l'Académie des Sciences* for the year 1718 is an account of a girl, who was born without a tongue, but had nevertheless learned to speak, and talked as easily and distinctly as if she had enjoyed the full benefit of that organ. The case is given by a physician of character, who had accurately and repeatedly examined the girl's organs of speech, and was desirous that others should examine them also.

About seventy years ago, our own country furnished us with another equally striking example of the same power, and which forms the subject of various papers in the *Philosophical Transactions*, drawn up chiefly by Dr. Parsons at the time, and printed in the volumes that were published between the years 1742 and 1747. It is the history of a young woman of the name of Margaret Cutting, of Wickham-market, near Ipswich, in Suffolk; who, when only four years old, lost the whole of her tongue, together with the uvula, from what is said to have been a cancerous affection; but still retained the powers of speech, taste, and deglutition, without any imperfection whatever: articulating, indeed, as fluently and with as much correctness as other persons; and articulating, too, those peculiar syllables which ordinarily require the express aid of the tip of the tongue for exact enunciation. She also sung to admiration, and still articulated her words while singing; and could form no conception of the use of a tongue in other people. Neither were her teeth in any respect able to supply the place of the deficient organs; for these also were but few, and rose scarcely higher than the surface of the gums, in consequence of the injury to the sockets from the disease that had destroyed the tongue. The case, thus introduced before the Royal Society, was attested by the minister of the parish, a medical practitioner of repute, and another respectable person. From its singularity, however, the Society evinced a commendable tardiness of belief. They requested another report upon the subject, and from another set of witnesses, whom they themselves named for the purpose, and for whose guidance they drew up a line of categorical examination. This second report soon reached the Society, and minutely coincided with the first; and, to set the question completely at rest, the young woman was shortly afterwards brought to London, and satisfied the Royal Society in her own person.

To explain this unexpected power, we should not only turn our attention to what is actually and in our own day accomplished by ventriloquists; but should recollect, that the tongue is only a single organ employed in the articulation of sounds, and that the fauces, nostrils, lips, and teeth, bear, at least, an equal part, while the glottis, which forms all the vocal or vowel sounds, is the chief organ of the whole. In reality, out of the twenty-four articulate sounds which fill up our common alphabet, the only two, in which the

GEN. IV.
SPEC. I.
Aphonia
elinguium.

Case of congenital destitution of tongue recorded by the Académie des Sciences.

Case furnished by our own country.

Tongue lost at four years old, together with uvula:

articulation retained perfectly; as also a power of singing.

Parochial attestation.

Royal Society eye-witnesses.

Articulation, by what means accomplished.

Enumeration of articulate organs.

GEN. IV.

SPEC. I.

Aphonia
elinguium.

Their relative
powers.

Tongue submits
to violence with
less mischief
than most
organs.

Illustrated by
operations of
Sir E. Home.

Conclusions
hence derived.

tongue takes a distinct lead, are the *l* and *r*, though it is auxiliary to several others; but the guttural, or palatine, as *g*, *h*, *k*, *q*; the nasal, as *m* and *n*; the labial, as *b*, *p*, *f*, *v*, *w*; most of the dental, as *c*, *d*, *z*, together with all the vowels, which hold so large a space in our vocabularies, are but little indebted to its assistance.

It is singular that so delicately sensible an organ as the tongue should receive the severest injuries, and submit to very violent operations, with less serious mischief, than almost any other organ of the same size in the body. And it is on this account that the cruel and barbarous manner, in which the tongue was extirpated by the ferocious tribes that over-ran Europe from the East formerly, was rarely productive of fatal consequences. Sir Everard Home published, many years ago, a paper upon this subject, containing various cases of sections of the tongue to a less or greater depth, in consequence of diseased action. The operation was, in every instance, performed by the ligature. He does not state what effect was in any instance produced on the speech, and we are hence led to conjecture, that nothing in this respect occurred of material importance: but he draws the following conclusions:—The internal structure of the tongue is less irritable, than almost any other organized part of the body. Its nerves appear to be more easily compressed and deprived of their power of communicating sensation, than nerves in general; and any injury done to them is not productive of diseased action in the trunk of the injured nerve. The tongue also has the power of throwing off its sloughs in a shorter time than any other part.

SPECIES II.

APHONIA ATONICA.

ATONIC DUMBNESS.

SPEECHLESSNESS FROM ATONY OF THE VOCAL ORGANS.

GEN. IV.

SPEC. II.

Chiefly confined to the
vocal nerves.

THIS atony is chiefly, if not altogether, confined to the nerves of the vocal organs, which may be injured by violence, or exhausted by mental or other commotion, independently of the occurrence of the disease occasionally as a symptom of paralysis, quinsy, or catarrh; thus furnishing us with two distinct varieties:—

α Oblæsa.

From lesion of the nerves of the tongue or glottis.

β Soluta.

From sudden or overwhelming commotion, or shock of any kind.

Dumbness from
injury to the
vocal nerves.

When from a
division of the
recurrent
nerves, mostly
incurable.

The instances of speechlessness produced by an injury of the lingual nerves are not common. But a division of the recurrent nerves, which are offsets from the par vagum, and distributed over the larynx and glottis, produces a speechlessness that is rarely, if ever, recovered from; for here the muscles belonging to the aryte-

noid cartilages, being rendered atonic or paralytic, can never be brought duly to contract again, the glottis remains permanently open, and the diameter of the larynx suffers no variety of contraction or dilatation. Galen seems to be the first anatomist who noticed this effect, or rather ascribed it to its real cause; for it was known, before his time, that, by making ligatures on the blood-vessels of the trachea, the noisiest animal is immediately struck dumb, and made quiescent. It was supposed that the state of the blood-vessels themselves, and not of the nerves included with them in the ligature, was the cause of this effect; that the blood became intercepted in its passage from the heart, and that the animal became mute because rendered comatose: and hence the name of carotids, or soporific vessels* (from *καρως*, *sopor*), was given to the arteries whose ligature was supposed to produce this very singular result. Galen, however, demonstrated very satisfactorily that the dumbness is, in this case, entirely owing to the pressure of the ligature on the accompanying nerves: and he afterwards produced to his opponents two cases of boys, who in a greater or less degree had lost their voice in consequence of the recurrent nerves being cut by surgeons unacquainted with anatomy, in extricating strumous tumours from the neck. In the one case, only one of these nerves was divided, and the voice was merely much weakened, or about half destroyed; in the other, both were divided, and the voice was lost altogether. A whizzing senseless noise, indeed, remains in most instances, as Vezalius has correctly observed; but there is no vocal sound, articulate or inarticulate.

Where the speechlessness has followed upon an injury of some branches of the lingual nerves, we have numerous examples of recovery. In one instance, the dumbness ceased suddenly after the patient had been speechless for not less than ten years.*

In other instances, dumbness is produced suddenly, from a total exhaustion of nervous power in the vocal organs, without any organic lesion whatever. A sudden and overwhelming emotion of the mind from terror, anger, or any other passion, has frequently had this effect in irritable habits. So has a violent fit of hysterics, or any other vehement shock which† instantaneously deprives the nerves of their sensorial power, and the muscular fibres of their irritability: as a stroke of lightning or a severe and unexpected blow on the stomach, will sometimes exhaust the vital energy of the entire system, and make life immediately cease. A sudden chill, as from drinking cold water during a violent heat, or the shock of a sudden fall, has frequently produced it, of which numerous instances are recorded in the Ephemerides of Natural Curiosities. Speechlessness of this kind has sometimes arisen from deleterious exhalations; from eating mushrooms; and in one instance, recorded in Hufeland's Annals, by repeatedly rubbing the wound made by a poisonous insect with saliva, and as often putting the finger to the mouth to obtain a supply of fresh fluid.‡ In like manner, Bonet

GEN. IV.

SPEC. II.

α A. antonica oblæsa.

First noticed by Galen and ascribed to its real cause.

How accounted for antecedently.

Origin of the term carotids.

Proofs offered by Galen.

β A. antonica soluta.

Singular origins.

* Sammlung, 1721. ii. 406. 503. Bresl.

† Büchner, Miscell., 1729. Bartholin. Act. Hafn. i. Obs. 101. Schurig, Chilologia, p. 205.

‡ See also Dupau, in Journ. de Médecine, Sept. 1789.

GEN. IV.
SPEC. II.
Aphonica
atonica.
Curative process.
Treatment.
Sometimes removed by the same violence that produced it.

informs us, that the same effect has followed from putting into the mouth a piece of money cankered with the rust of verdigris.*

Where medical aid is required, our dependence must be on tonics, local or general, and topical stimulants. Blisters and masticatories have chiefly been made use of, and frequently with good effect; as has the vellication of a hair-brush contrived for the purpose. The dumbness has sometimes yielded to emetics, at others to electricity†, and, in a few cases, to a cough‡; and occasionally the same, or a like violence which occasioned the disease, has removed it, and the cause has become the cure; as is reported of Athys, the son of Cræsus. In like manner, we have examples of its having yielded abruptly to a fit of anger, or terror; in one instance, to a fit of laughter§; in another, to a blow on the head.||

SPECIES III.

APHONIA SURDORUM.

DEAF-DUMBNESS.

SPEECHLESSNESS FROM DEAFNESS, CONGENITAL OR PRODUCED DURING INFANCY.

GEN. IV.
SPEC. III.
The ears as necessary to speech as the vocal organs.
Why the deaf are not always dumb.
Necessarily dumb where the deafness is congenital.
Such may receive a communication of ideas by the eye, and acquire a knowledge of language.

THE ears are as necessary to speech, or articulate sounds, as the tongue, or even the glottis; for, if such sounds be not heard, and distinctly discriminated, they can never be imitated. Persons who become deaf after a thorough acquisition of speech, do not become dumb, for the very reason that articulation has already formed a habit, and can easily be preserved by practice. But, if deafness be congenital, or take place antecedently to such habit, articulation can never be acquired afterwards, unless, by some rare good fortune, the ears should acquire hearing; and the unfortunate individual can only receive and interchange ideas by the eye, through which medium, however, he may be taught written, though not oral, language, and thus still, happily for himself, have his mind almost as richly stored, though not his ideas as readily communicated, as through the outlet of speech. Persons thus organically defective are denominated *sourds-muets*, or *sordi muti*, on the continent, and sometimes deaf-dumb among ourselves.

[In eastern courts, it has been usual from time immemorial to retain a number of mutes. These are not only employed to amuse the monarch, but also to instruct his pages in an art, to us little known, of communicating every thing by signs, lest the sound of

* Bonet, Sepulchr. Lib. i. § 22.

† Krazenstein, Pr. Hist. restitutæ Loquelæ par Electrizationem. Hafn. 1753.

‡ Iperen. Abb. aus holl. Schriften. b. i. p. 356. Morgagni, De Sed. et Caus. Morb. Ep. lxiii. art. 15.

§ Iperen. ut supra.

|| Ephem. Nat. Cur. Dec. iii. An. v. Obs. 236.

their voices should disturb the sovereign. The mutes are also the secret instruments of his private vengeance.*]

This is an interesting subject, and not unconnected with pathological science, since it opens to us the only remedy that can be resorted to where the defect before us, or that of deafness prior to articulation, is the subject of discussion. It is interesting also to us from the very considerable proportion of human beings which in all countries, and, apparently, in all ages, have been sufferers from this melancholy affection; a proportion that has been ingeniously calculated from a comparison of various tables, deduced from the extent of the disease in different parts of the world, as amounting to 1 in 2441 individuals.† [In Germany, it is estimated, that, in every million of people, one hundred are deaf and dumb; and, in the Danish dominions, the deaf and dumb amounted to 515 in the different bishoprics, whose population was only 820,621, according to returns, made at the first anniversary of the Copenhagen Institution for this class of afflicted persons. In Bornholm, the proportion was still greater.‡] And it is peculiarly lamentable to observe that, when the defect has once made an entrance into a family, whether from the influence it produces on the nervous system of the mother, or from any other less obvious cause, it is particularly apt to become common to those children which are born afterwards: insomuch that we often meet with a third, or a half, and, in a few instances, where the first-born has been thus affected, with every individual of the progeny, suffering from the same distressing evil. "The late investigation in Ireland discovered families, in which there were two, three, four, or more, thus circumstanced. In one family, there were five children all deaf and dumb; in another, seven, in another, ten; and, in that of a poor militia officer on half-pay, there were nine born deaf and dumb in succession."§ Yet it is consoling to reflect that the defect is not always propagated to a succeeding generation, when the deaf-dumb have married, and even when both the husband and wife have been thus afflicted. [Still, it is said that such propagation is not uncommon||, and, as deafness is, without doubt, often hereditary, the experiment of marriage should be carefully avoided.]

To pursue the calamity, however, into the various plans which the benevolence and ingenuity of the human mind have invented to supply the defect of speech, from the times of [Juan Pabbo Bonnet¶, of Madrid,] Ammanus of Amsterdam, and Wallis of our own country, to the wonderful degree of perfection attained under the Abbé Sicard, in the Royal Institution at Paris, would carry us far beyond the limits to which the present work must be confined. And I shall therefore only observe, that the grand principle laid down under almost all the various plans and systems

GEN. IV.
SPEC. III.
Aphonia
surdeum.

Proportion of
deaf-dumb to
others.

Often follows
in succession
in the same
family, when
once intro-
duced.

Instanced in
Ireland.

Not always
propagated to a
succeeding
generation.

General princi-
ple adverted to
in instructing
the deaf-dumb.

* See Edin. Med. Journ., vol. vii. p. 61.

† Quarterly Journal of Foreign Med., vol. i. p. 319.

‡ Allgemeine Literatur Zeitung. June, 1807.

§ Quarterly Journal of Foreign Med., vol. i. p. 321.

|| Edinb. Med. Journ., vol. vii. p. 62.

¶ Reducion de las letras y arte para ensennar a ablas los Mutos. En Madrid; 1620. 4to. The earliest known work on the subject of instructing the deaf and dumb. — ED.

GEN. IV.
SPEC. III.
Aphonia
surdorum.

that have been devised, in order to obtain the proposed remedy, and supply the want of speech, is that of commencing with picture-characters, and making these the key to alphabetical and arbitrary signs: and, in this manner it is, that the eye is rendered subservient to the purposes of the ear. When the deaf-dumb scholar is made to understand, that the picture of a knife or of a ship is to be regarded as the representative of such objects or ideas, there is no great difficulty in teaching him, that the arbitrary letters of which these words are composed, and which for this purpose are always written or should be written underneath these pictures, are intended to stand for the same purpose as the pictures themselves, and to import the same objects or their ideas, whenever they are met with in a certain arrangement: and so of other pictures, and other combinations of letters which are equivalent to them. And hence, such combinations of letters, when the learners are accustomed to them, will as effectually become the signs or representatives of the objects they are intended to express, as the pictures which preceded their use. The power that appertains to each separate letter is a lesson to be learnt long afterwards; and still longer afterwards an idea, for it can never be any thing more, of the vocal or articulate effects produced by different movements of the lips, cheeks, and throat, which that letter is designed to express.* An accurate and habitual attention, however, will teach the scholar this; and he will, in a considerable degree, be able to make out what is spoken by the motion of the lips and other vocal organs alone; and, if he possess a facility of copying these, he may be taught, still farther, how to measure and modulate them, so as to produce the articulations they are intended to convey, and to speak with tolerable accuracy, without hearing himself: while a fellow-scholar labouring under the same defect, and having made an equal progress in the same kind of education, will understand his meaning, or the vocal terms he conveys, by the mere movement of the vocal organs alone. I have myself borne a part in such conversations at that excellent institution of this metropolis, the Asylum for Deaf and Dumb Children, and have seen scholars conversing in this manner without hearing a single syllable on either side, but at the same time with a perfect understanding of each other's meaning.

Speaking by
the deaf-dumb
learned long
afterwards:

How-acquired.

How convers-
ation can be
maintained be-
tween deaf-
dumb persons.

Singular case
of habitual con-
versation be-
tween persons
totally deaf.

Conversation,
how maintained
in the dark.

Mr. Waller relates a singular case of this kind, in a man and his sister, who lived together to an advanced age, neither of them having the least sense of hearing, but who understood each other as well as other persons by the motion of the lips alone; supporting themselves by daily labour. They became deaf, however, when children, after they had learned to speak; and hence, in moving their lips, they continued to articulate, though not very distinctly.†

[A curious account is given by Bishop Burnet of a girl at Geneva, who could hold a conversation in the dark by laying her hand upon

* See the Abbé de l'Epée's *Institution des Sourds et Muets par la voie des signes méthodiques*, &c. Paris, 1776.

As also the Abbé Sicard's "*Théorie des Signes, ou Introduction à l'étude des langues; où le sens des mots, au lieu d'être défini, est mis en action*," tom. ii. 8vo. 1808.

† Phil. Trans., vol. xxv. 1707, No. 312. p. 2468.

her companion's lips. The possibility of such a circumstance, it is said, has not been confirmed by subsequent experience. The mode adopted for conversing in the dark, is by writing the word intended to be communicated upon the palm of the hand, or the back of the neck, thus addressing the sense of touch, which, as well as that of sight, is rendered by attention and exercise wonderfully acute.*]

I have said, that the mode of commencing instruction in *almost* all the schools of the kind before us, is by pictures or other imitative signs, and that a knowledge of alphabetical characters does not take place till long afterwards. The limitation is introduced, because, in a few of the French schools in the present day, and particularly that at Bourdeaux, under the superintendence of the Abbé Gondelin and M. Gard, this easy and natural order is reversed, and the tutors have voluntarily loaded themselves with a very unnecessary difficulty, and their scholars with a useless and incomprehensible burden of many months' duration. For what reason the disciples of the Abbé Sicard, or of the Abbé de l'Épée, should thus intricately deviate from the plain and simple path of their masters, it is not easy to conceive.

The extent of knowledge, and even the expansion of genius, which the deaf-dumb have occasionally exhibited, are truly marvellous; of which, indeed, M. Gard himself, to whom we have just referred, is a striking example. This gentleman was born with the faculty of hearing, and only lost it in his seventh year of childhood: so that his mind must have become stored with a multitude of ideas, derived from the inlet of hearing, which he could not have acquired afterwards. It is said that, in consequence of his deafness, he so completely lost the power of speech, as to forget even the commonest words that had been familiar to him. This feature, however, in his history seems to be considerably overcoloured; yet, it is well known, that he did not commence any plan of education till he was twenty-seven years old: from which time, such was the vigour of his mind, and the assiduity of his pursuit, that the able and professional critic, to whom I have just referred, affirms, "he is perfectly well informed upon all subjects which are usually studied; well versed in history, literature, politics, and languages. He has been taught Greek and Latin; and has, by himself, acquired the English language, of which he even showed us a grammar written for his own use. On presenting him with a printed report of one of our institutions, he immediately translated a part of it into French.†"

Yet it is well known, that there are several other scholars of the same school that have excelled even M. Gard; and who, having been born perfectly deaf, have been necessarily dumb, from the same period; of whom it may be sufficient to mention M. Clerc and M. Massieu. The last was literally taken from the plough, in the department of the Gironde, and was carried by a stranger, who happened accidentally to see him, and took compassion on him, to M. Sicard, at that time stationed at Bourdeaux. By dint of hard study, and a comprehensive capacity, he has also raised himself to the office of assistant instructor to M. Sicard, in the Parisian

GEN. IV.
SPEC. III.
Aphonia
surdorum.

French schools.

Extent of
knowledge and
genius often
evinced.

Illustrated in
M. Gard.

Other ex-
amples.

* See Edin. Med. Journ., vol. vii. p. 62.

† Quart. Journ. of Foreign Med., vol. i. p. 322. 1819.

GEN. IV.
SPEC. III.
Aphonia
surdorum.

Examples of
acquisition of
speech on re-
covery from
congenital
deafness.

school, where he teaches the departments of syntax, history, geography, and *religion*. On one occasion, happening to be robbed, he pleaded his own cause in the court of justice; and when, during the French revolution, his revered master was put into prison, he addressed a letter of so much force and feeling to the President of the National Assembly, as to obtain his liberation.

There are a few instances on record of a recovery from deafness many years after birth, and of a gradual acquisition of speech in consequence hereof; chiefly produced by some violent but fortunate affection of the brain. Thus Lambzwerde relates the case of a fortunate fracture of the skull, through a fall from a considerable height, by which a young person, deaf-dumb from birth, was suddenly endowed with hearing, and, in process of time, with speech.* In like manner, Mr. Martin gives an account of a native of Stratherig, near Inverness, of the name of Fraser, who was born deaf, and continued dumb till seventeen years of age, when he was attacked with a fever which affected his brain for some time; on recovering from this, he began to have a sense of hearing, and soon afterwards to understand speech, which he gradually imitated, and at length acquired, so as to converse fluently; though, from commencing at so late a period, he never attained perfect accuracy in articulating many words.†

[Rosenmüller has dissected most carefully the organs of hearing and of speech in persons born deaf, but could discover nothing peculiar in them. As a means of cure, he has tried galvanism without success, and it has been tried by others quite as ineffectually. One child suffered acute pain during the application of the pile, and seemed to be benefited for a month, but afterwards relapsed.]

Puncturing the tympanum has been recommended by M. Delear‡; and in a few instances with ourselves, as well as abroad, it has succeeded. It is hence worth trying, though the success has been very rare.

Complete con-
genital deafness
and dumbness
first removed at
the age of nine
years.

[In 1825, the particulars of a deaf-dumb boy, to whom the faculty of hearing was first communicated when he was nine years old, were read to the Royal Academy of Sciences at Paris. The treatment, from which this success was derived, consisted in injecting air and fluids into the tympanum through the Eustachian tube; a practice very commonly adopted by Dr. Itard. The boy, named Claude Honoré Trézel, had a physiognomy of little expression; the emblem of his understanding. He slodged and reeled about as he walked; could not even blow his nose; and made his principal wants known by signs. The first few days, immediately following the first establishment of his hearing, were a period of rapture to him. All kinds of noises gave him excessive pleasure; and, while listening to a musical snuff-box, he seemed in a sort of ecstasy. But it was some time before he could comprehend, that speech was a means of social communication. Hence, at first he did not attend to the sounds by which it was formed, but only to the movements of the lips. For this reason, he fancied that a child, seven years old, spoke exactly like grown-up persons. At length, however, he was taught, that the sounds were of more im-

* Append. ad Amœnit.

† Phil. Trans., vol. xxv. No. 312. p. 2469.

‡ Journ. Complémentaire, Juin, 1822.

portance than the motions specified. In this stage of improvement, he unluckily happened to hear a magpie utter some phrases, and, generalising from this particular fact, he inferred, that all animals were gifted with speech, and he actually beat a favourite dog to make it pronounce "*papa*," "*du pain*," the only words he could himself speak.

These first advances in hearing produced a considerable alteration in the boy's physical state. His gait became firmer, his dull countenance assumed a smiling gay air, and he learned to blow his nose. A month passed away without much further improvement; and it was a quarter of a year before the lad could understand a few compound words, and the meaning of some plain short phrases. It was a good while also before he could ascertain the direction of sound. Hence, when a person concealed himself in his room, and called him, he had the utmost difficulty in finding out the place in which the speaker was hidden, and then traced it rather with his eyes and reason than his ears.

The earliest sounds, which he acquired the power of forming, were low and grave; and the first words which he learned to speak were, "*papa*, *tabac*, *du feu*," &c. But, when he wished to pronounce more complex words, he exhibited various contortions of his lips, tongue, and all the agents of pronunciation, the uses of which he was completely ignorant of; resembling in this respect a beginner in dancing or swimming, who exhausts himself by useless ungraceful efforts. At last he succeeded in pronouncing a few compound words which had previously baffled him. His progress continued, however, to be very slow; and he either skipped over many syllables, or pronounced them imperfectly. Perhaps, indeed, he would never have overcome this difficulty, had not the plan of instructing him through the sense of vision, instead of through that of hearing alone, been put in practice. Various syllables were now written down, and pointed out to him; and, from this period, his pronunciation improved fast, as he comprehended with greater clearness the assemblage of vowels and consonants, and their reciprocal influence. Here, as M. Magendie observes, we see a very remarkable fact; namely, that the association of vision with the motions of the larynx was prompt and easy, while that of hearing with the organs of voice was always difficult, and but slowly acquired. Thus, when the boy looked at the written syllables, and they were pronounced near him, he could pronounce them himself; but, if the writing were removed, the clearest pronunciation of certain syllables, close to him, did not enable him to articulate them himself.

By dint of the foregoing method, the boy learned to read and write tolerably fast; but, like persons who study a foreign language, and who generally learn to read and write it long before they can speak it, he still reads with his eyes, and writes infinitely better than he speaks. One curious circumstance is particularly recorded: whenever a word is distinctly pronounced to him, he immediately repeats it. For instance, when he is called, he never fails to repeat his name. When his preceptor tries to make him understand things, it is by gestures and looks; the means by which the boy himself most readily expresses his own ideas.

The improvement of his condition is wonderful: a year previous

GEN. IV.
SPEC. III.
Aphonia
surdorum.

GEN. IV.
SPEC. III.
Aphonia
surdorum.

to the date of this history he was so deaf that he was insensible of the loudest explosions; he now hears all noises very well; knows whether they come from a distance; can distinguish their nature; gets out of the way of carriages and horses, and runs to open the door when it is knocked. He relishes music, and understands and repeats by memory certain phrases within his compass, and gives answers to them. He is also able to do what his tutor directs him to do by words, though he cannot yet do this with other persons.

Finally, as M. Magendie observes, when it is reflected how much the boy must have learned to attain his present improved state; what new ideas and combinations must have taken place in his mind; what instinctive associations must have been formed between his ear and understanding, between this and his organ of voice, and his ear and his larynx, there is every reason to hope, that his moral and physical state will yet continue to receive further melioration.*]

GENUS V.

DYSPHONIA.

DISSONANT VOICE.

THE SOUND OF THE VOICE IMPERFECT, OR DEPRAVED.

GEN. V.
Voice contra-
distinguished
from speech.

Hence voice
common to
many animals
that are desti-
tute of speech.

VOICE, as we have already observed, is the sound of the air propelled through, and striking against the sides of, the glottis: while speech is the modification of the voice into distinct articulations, by means of particular muscles in the cavity of the glottis itself, or in that of the mouth or the nostrils, employed as signs of ideas. Hence, voice belongs to many animals in common with man: speech, thus limited as to its object, belongs to man alone: for no other animal can distinctly articulate, and make use of articulations, as signs of what is occurring in the mind: though a few animals may be taught to imitate articulate sounds without having ideas attached to them. The present genus embraces the morbid affections to which the voice is subject; the next, those which appertain to the speech. It includes three species: —

- | | |
|-------------------------|--------------------|
| 1. DYSPHONIA SUSURRANS. | WHISPERING VOICE. |
| 2. ————— PUBERUM. | VOICE OF PUBERTY. |
| 3. ————— IMMODULATA. | IMMELODIOUS VOICE. |

* See Journ. de Physiol. Expér., tom. v. p. 223, &c.

SPECIES I.

DYSPHONIA SUSURRANS.

WHISPERING VOICE.

VOICE WEAK, WHISPERING, AND SCARCELY AUDIBLE.

MANY of the causes of atonic dumbness, when operating with a less degree of violence, become causes of the present affection, while a few are peculiar to itself. The following varieties may not unfrequently be noticed:—

GEN. V.
SPEC. I.

| | |
|-------------------------|--|
| α Oblæsa. | From lesion of the nerves of the larynx. |
| β Pathematica. | From sudden emotion of the mind. |
| γ Compressorica. | From permanent compression of the trachea. |
| δ Catarrhalis. | From neglected catarrh. |
| ϵ Enervis. | From simple debility of the larynx, without any obvious cause. |

Independently of which the present species is occasionally met with as a symptom in melancholic, paralytic, and hysteric affections, as also in quinsy, dysphagy, and catarrh.

The nerves which, when injured, chiefly produce whispering, are the recurrent. When these are divided, dumbness, as we have already observed, is the result; but they are often weakened and, perhaps, otherwise injured without being divided: and in this case the voice is not actually lost, but dwindles to a whisper, and is recovered as soon as the nerves resume their tone. The voice has, in this manner, frequently been injured by straining the ligaments and the minute muscles which move the parts of the glottis on each other; and in elevating the voice to a high pitch in public addresses, or striving at a note in singing which the natural compass of the voice will not reach. So Pliny tells us, that the voice of Gracchus, during a violent exertion in speaking, suddenly sunk to a feminine treble. Astringent gargles, blistering the throat, cold local bathing, external and internal, with perfect quiet and silence, are the best means of recovering the voice under such circumstances. The last I have found most serviceable, and have made the patient gargle four or five times a day with ice-water, which, at the same time, should be applied to the throat with a wet napkin.

 α D. susurrans
oblæsa.

Causes.

Treatment.

A sudden and overwhelming emotion of the mind from various causes will sometimes totally choke or stifle the voice, which is particularly the case with rage: but, where the effect is not so violent, the voice becomes an almost inaudible whisper, and particularly when the passion is fright or terror. Rest and the return of confidence will usually restore it in a short time; but, in some instances, the effect has been permanent.

 β D. susurrans
pathematica.

GEN. V.
SPEC. I.
γ D. susurrans
compressoria.

δ D. susurrans
catarrhalis.

Singular case
of sudden re-
covery.

Remedial pro-
cess.

Erysimum
officinale.

Syrup of
horse-radish.

There are various cases in Morgagni and Bonet, in which the voice was rendered almost inaudible from the pressure of an enlarged heart, a bronchocele, or an aneurism of the aorta against the vocal avenues. Sauvages has referred to these; and it is highly probable, that such a pressure, by diminishing the capacity of the trachea, may lower the power of the voice.

A catarrhal whisper is a frequent occurrence, and there can be few practitioners who have not met with examples of it. The voice is often injured from the commencement of the catarrh, as well as in consequence of the inflammatory affection of the mucous membrane of the glottis, as of the increased secretion of mucus that issues from the interior of a great part of the trachea: and in some cases in which the inflammation had become chronic, by pulling forward the tongue I have seen the epiglottis covered with a cream-coloured coating, which was probably extended lower, and was a chief source of the difficulty of utterance. But the variety before us is the result of that weakness, which inflammatory action induces in the vocal organs, as a sequel, rather than a symptom, of the inflammatory action itself.

Mr. Archdeacon Squire relates a singular case of this kind in an attorney at Devizes, of the name of Axford, who, at twenty-eight years of age having caught cold, was seized with a hoarseness that in six days rendered him totally speechless; in which state he continued after the cold left him; being totally incapable of distinct articulation, and scarcely able to make the least inarticulate sound. Four years afterwards, he got so much intoxicated as to fall from his horse several times on his way home; and was at last taken up by a neighbour, and put to bed in a house on the road. He fell asleep; and dreaming that he had fallen into a furnace of boiling wort, he was put into so great a fright that, struggling with all his might to call for help, he actually did articulate aloud, and recovered the use of his speech from that moment as effectually and perfectly as he had ever had it in his life.*

For habitual hoarsenesses, leading to the present affection, the *silicosæ* offer the best class of medicines; and, with respect to many of them, there is no great difference, except what results from their greater degree of acrimony. It is common to all these, on being swallowed, to stimulate the fauces, and especially their mucous glands, and thus to excite a more copious excretion of mucus. Of this family of medicines the *erysimum officinale*, or hedge-hyssop, was at one time in higher reputation for habitual hoarseness than any of the rest: and Dr. Cullen seems disposed to support this preference, chiefly upon the ground of its being less violent in its stimulant power than the generality of them. He recommends the juice of this plant, mixed with an equal quantity of sugar or honey into a syrup. And where the *erysimum* is not at hand, he recommends its place to be supplied with a syrup of horse-radish, but made weak, so that it may be frequently used, or long continued, without rendering the fauces sore or uneasy.† For this purpose a drachm of the root, fresh and scraped, may be infused in four ounces of boiling water for two hours in a

* Phil. Trans., vol. xlv. 1747-8, p. 148.

† Mat. Med., part ii. class v. p. 166.

close vessel, and made into a syrup with double its weight of sugar. Of this a tea-spoonful, swallowed leisurely for a dose, will often be found highly serviceable.

GEN. V.
SPEC. I.

We sometimes meet with a debility in the organs of the voice which reduces it to a whisper, without being able to ascribe it to any particular cause. This is often temporary, and seems to occur from a sudden deliquium of nervous power in these organs; as when, in the middle of speaking or reading, and this too in an agreeable tone, the voice abruptly fails, and is as abruptly resumed. In the case of the orator Gracchus, to whom I have just adverted, Pliny informs us, that the voice was restored by the sound of a pipe, that, being struck by his servant, gave the proper pitch. In some instances, however, this failure of the voice has been more or less permanent or intermissive. I had lately a lady under my care, of about forty-five years of age, who was usually attacked in sudden and irregular paroxysms, each continuing for several weeks. Repeated blisters, stimulant astringent gargles, as of port wine or alum water with tincture of myrrh, and a steady perseverance in a tonic regimen and pure country air succeeded. She recovered by degrees the full power of her voice, which, during the paroxysms, was nothing more than a weak and almost inaudible whisper; and has had no return of the affection for several years. In another case of the same kind, adverted to in the Nosology, the same plan proved less successful. The patient was a gentleman of about forty years of age, otherwise in good health, who had never spoken, except in a whisper, for more than eight years. [Electricity, galvanism, and tonic medicines might be tried; and, in a few examples, the editor has known the application of strong liniments, blisters, and antimonial ointment to the integuments covering the larynx, give the voice its proper strength.*]

ε D. susurrans
enervis.

Singular re-
covery.

Further illus-
trated.

Treatment.

* Dr. Elliotson refers, in his lectures, to a species of aphonia, in which the voice is sometimes lost, or reduced to a mere whisper, without any inflammation, œdema, or obstruction of the parts. It occurs chiefly in females, and is regarded altogether as a nervous complaint. Frequently it comes on suddenly, and ceases in the same manner, and is sometimes accompanied by other nervous affections. The shower-bath, and attention to the general health, are the means of relief advised by Dr. Elliotson. — Ed.

SPECIES II.

DYSPHONIA PUBERUM.

CHANGE OF VOICE. VOICE OF PUBERTY.

THE VOICE DISSONANT AND UNTRUE TO ITSELF, IRREGULARLY ALTERNATING FROM HARSH TO SHRILL: CONFINED TO THE AGE OF PUBERTY.

GEN. V.
SPEC. II.
Sympathetic connexion of the sexual system with the vocal and other organs.

Character and proximate cause of the affection.

Origin of the affection explained.

Requisites to a perfect voice.

Deviation from these requisites in puberty.

THE change that, during the period of puberty or adolescence, takes place in the sexual system for the purpose of giving perfection to its organs, is well known to be connected, by sympathy, with an equal change in various other parts of the body. In females, the breasts assume a soft and beautiful swell, and the nipples a pleasurable irritation. In males, the chin is covered with a beard, and the voice becomes fuller, deeper, and more sonorous. Before the voice, however, acquires this important change, it often exhibits great irregularity; and the youth, incapable of modifying his own tones, passes abruptly from harsh to shrill, and from grave to acute. And it is this irregularity and uncontrollable dissonance of voice, which constitutes the present species.

There is no great difficulty in accounting for this abnormal state of the voice, at the period before us. The glottis is nearly as complicated in its structure as the eye or the ear, and the modulation of its tones depends upon an equal degree of elasticity and pliability in all its moveable parts, and in their perfect submission to the authority of the will. To the attainment of a correct voice it is necessary, that there should be great accuracy of ear; a perfect symmetry of the vocal organs; equal tenseness in the ligaments of the larynx, which must be also nicely balanced by the powers of the muscles on each side; the cartilages of the larynx must be delicately adjusted to each other; the lateral cavities equally deep, and the cornua of the os hyoides of a like length. With such an organization, the voice is perfected for exact modulation in speaking or singing; and it is from different defects in this requisite mechanism, that some persons cannot speak, and others cannot sing in tune.

Now, in the change that takes place during puberty, every part does not always harmonize with the rest; some parts become more tense, others less, and yield more easily; some are more relaxed, others more contracted; and of the effect producible by such a state of the glottis, a tolerably distinct idea may be formed from a remark of Dodart, that a variation in the capacity of the glottis, not exceeding the fifty-fourth part of a silk-worm's thread, or one three hundred and fifty-fourth part of a hair, will occasion a difference of tone. Time, however, and repeated exercises of the will, usually triumph over these discrepancies, wherever they exist, in a few months; when the voice recovers its unity of tone, and becomes graver in proportion as its motive powers become firmer and

denser; and hence the reason, why the voice of males is graver than that of females. In males, also, the glottis becomes more capacious, which forms another cause of gravity of tone. The deepest tones are struck by animals that have the largest glottis, as the phoca, the ox, the *ardea stellaria*; while singing birds, which sound the acutest tones, have a glottis capable of the closest contraction. The deepest roarings are produced by animals that have the cartilages of the trachea entire, or imbricated, or tessellated with bones, as the lion, the elephant, and the peacock.

GEN. V.
SPEC. II.
Dysphonia
puberum.
The voice of
males why
graver than
that of females.
Hence the still
deeper tones of
some animals
than of others.

SPECIES III.

DYSPHONIA IMMODULATA.

IMMELODIOUS VOICE.

THE VOICE PERMANENTLY DEPRAVED, OR INHARMONIOUS.

THIS species offers the six following varieties:—

GEN. V.
SPEC. III.

- | | |
|----------------------------|--|
| α Rauca. | The voice naturally or habitually |
| Rough or harsh voice. | hoarse, harsh, or rough. |
| β Nasalis. | The voice sent with a cracked and |
| Speaking through the nose. | grating sound through the nostrils. |
| γ Clangens. | The voice shrill and squalling. |
| Squeaking voice. | |
| δ Sibilans. | The voice accompanied with a |
| Whizzing voice. | whizzing or hissing sound. |
| ϵ Stertens. | The voice accompanied with a |
| Guttural voice. | snorting, snoring, guttural, or stertorous sound. |
| ζ Palatina. | The voice hoarse, obscure, indis- |
| Palatine voice. | tinct, with a fissure or other defect in the palate. |

Of most of these, the cause will be obvious from the observations already offered. Thus, the squeaking voice proceeds, ordinarily, from too narrow a glottis; the rough or harsh voice, from a glottis too wide, and not sufficiently moistened with mucous secretion. In the whizzing voice, there is too much secretion, but of too limpid a consistence.

The guttural, or stertorous variety is commonly the result of a relaxed glottis, or velum palati, with an accumulation of thickened mucus; and here local stimulants, astringents, and tonics, together with a steady and determined exertion to obtain a modulated voice, will frequently prove successful. If we put out of consideration a few cases, in which some fissures in the palate have been cured on the principles applied to the hare-lip, the obscure palatine voice, commonly congenital, but sometimes a sequel of lues, can only be assisted by filling up the fissure in the palate with a silver plate,

General
remark.
Squeaking
voice, how
produced.
Harsh voice.
Whizzing voice.
Guttural voice.

Palatine voice.

GEN. V.
 SPEC. III.
 Dysphonia
 immodulata.
 Nasal voice;

 incorrectly
 called speaking
 through the
 nose.

properly secured by a spring, or, when necessary, by an entire false palate of the same metal. Yet, the most dexterous artist will sometimes find his ingenuity unavailing, and the defect beyond his skill. The nasal voice is produced, ordinarily, by an obstruction of the nasal fossæ from condensed mucus, as in a cold of the head, a polypus, or some other organic defect; the remedy or removal of which, where this can be attained, will restore the voice to its proper clearness. In common language, we denominate this variety *speaking through the nose*, but most incorrectly; for it is occasioned alone by our not having the nasal passages clear; and consequently from not being able to speak through them with our usual facility.
 This last is often the result of affectation, or a foolish habit, not easy to be conquered when once acquired.

GENUS VI.

PSELLISMUS.

DISSONANT SPEECH.

THE ARTICULATION IMPERFECT OR DEPRAVED.

GEN. VI. In the preceding genus, the imperfection or depravity exists, not in the articulation, but in the sound of the voice; whence the distinction between that and the present is clear. Psellismus embraces two species; that of STAMMERING, and that of a VICIOUS ENUNCIATION.

- | | |
|-------------------------|-----------------|
| 1. PSELLISMUS BAMBALIA. | STAMMERING. |
| 2. ————— BLÆSITAS. | MISENUNCIATION. |

SPECIES I.

PSELLISMUS BAMBALIA.

STAMMERING.

THE FLOW OF THE ARTICULATION DISTURBED BY IRREGULAR INTERMISSIONS OR SNATCHES.

GEN. VI. This affection may be regarded as a sort of clonic spasm, or St. Vitus's dance confined to the vocal organs, and offers us the two following varieties:—

- | | |
|-------------|-------------|
| α Hesitans. | Hesitation. |
| β Titubans. | Stuttering. |

In the **HESITATING VARIETY**, there is an involuntary and tremulous retardation in articulating peculiar syllables. The organs are generally too mobile and unsteady, and the will has lost its control over them, if it ever possessed any. By reverting to the remarks made on *Dysphonia puberum*, the physiology of the affection will be easily understood. As bad habits are more easily learnt than good ones, because they are more striking, and more strongly arrest the attention, this complaint is often caught by imitation, and especially among children; who, for this reason, ought never to be intrusted in the company of a stutterer, till their speech has become steady and confirmed.

In the **SECOND VARIETY**, we have a higher degree of stammering, than in the first; accompanied with more impetuosity of effort. It consists in an involuntary and tremulous reduplication of some syllables, alternating with a tremulous hurry of those that follow. "I would thou couldst stammer," says Shakspeare, with a striking illustration of this morbid affection, "that thou mightst pour out of thy mouth, as wine comes out of a narrow-mouthed bottle, either too much at once, or none at all."

The convulsive actions of the muscles of the glottis, and which are communicated to the other organs of speech, whether productive of the present or the preceding variety, may often be overcome by a firm and judicious discipline; insomuch that some of the most distinguished orators of both ancient and modern times are well known to have been subject to this affection in their youth. In ordinary conversation, or where a man has time to pick out single words, instead of speaking whole sentences, the stammerer always hesitates most; and hence always least where his attention is completely engrossed. On which account, there are many stammerers that scarcely utter a word in speaking without betraying themselves, who, nevertheless, sing, and enunciate the words of the song, without any hesitation whatever, their whole mind being led away with the tune, and a strong desire to keep in time and harmony; while there are others who hesitate as little in reading, the words being immediately before them, and their attention being swallowed up in the subject. One of the worst stutterers I have ever known, was one of the best readers of Milton's *Paradise Lost*. He was a scholar of considerable attainments, and had taken some pains with himself for his natural defect, but without success; yet the moment an interesting poem was opened, his defect completely vanished, from his being led captive by the force of the subject, and the great interest he took in this branch of polite letters.

This affords us one mean, therefore, of remedying the evil before us: the stammerer should learn by heart, and repeat slowly, what, ever most arrests his attention. But, at the same time, he will must learn to obtain a control over the muscles of articulation; and, for this purpose, single words should be uttered for hours at a time, deliberately, and when alone; and perhaps too, as was the custom of Demosthenes, a practice of haranguing by the sea-shore, or on the brink of some awful waterfall, where the fearful noise and the magnificence of the scenery have a tendency to break in upon the habit, and render the conquest the easier, may be often found advantageous. It would at least stimulate the

GEN. VI.
SPEC. I.
α P. Bambalia
hesitans.

Pathology.

β P. Bambalia
titubans.

Character.

Defect may be
often overcome.

Hesitation most
when the words
are most
thought of or
hunted for;
hence many
stammerers
sing well.

and others read
well.

Remedial
process.

Single words
to be repeated
slowly, and for
hours at a time.
Haranguing by
the sea-shore,
or by some
sonorous water-
fall.

GEN. VI.
SPEC. I.
β P. Bambalia
titubans.

speaker to strain his voice to the full extent of its power, and thus fit him for public speaking before large bodies of people, where a loud and elevated voice can alone be heard distinctly; which was probably the chief object Demosthenes had in view; for we are expressly told, that his voice was weak, as well as his speech tremulous and hesitating. Adults, who have firmness and perseverance enough for the purpose, may undertake the task of disciplining themselves; but children should always be put under the care of a judicious tutor, whose best qualifications will be patience and good temper. A very few words only should be marked down at a time for trial, and these should be attempted separately; nor should a second lesson be entered upon till the first has been completely mastered, although the effort should demand many weeks, or even months. An acquisition of one lesson will always facilitate that of another.

Whether an insufficiency of air in the lungs be sometimes, the cause of stammering?

[Dr. M'Cormac * conceives, that the cause of stammering arises from an attempt to speak while the lungs contain an insufficient quantity of air. This habit, he says, is acquired from undue haste and imitation; and the successful method of treatment consists in making the patient always inhale a proper quantity of air into the lungs before he attempts to speak, and to direct him always to pronounce very slowly, until the bad habit is broken. When the patient stutters very much, the practice of making long inspirations and expirations is stated to be a good preliminary exercise. The main thing to be attended to, and what in fact is the groundwork of the whole system of cure (Dr. M'Cormac says), is to expire the breath strongly each time when attempting to speak, the lungs being previously filled to the utmost. As it will be some time before the patient can husband the air of his expirations, so as to say all he would wish in one breath, he must not commence by repeating sentences during each expiration, but only simple monosyllabic sounds. During the intervals, all conversation should be avoided, until the cure is somewhat advanced. It appears to the editor that, although the practice here inculcated is unquestionably right, the theory, on which it is founded, is not altogether so free from doubt. While the practice, recommended by Dr. M'Cormac, comprises slowness and deliberation, which are, indeed, indispensable parts of it, the theory of the lungs not having air enough in them, and of this being the cause of the infirmity, may not be correct. The voice of some stammerers, whom the editor has known, has been so strong as scarcely to justify such a conclusion; and he is still inclined to believe, that a want of proper control over the muscles concerned in articulation, must be regarded as the chief cause of the present affection. At the same time it must be granted, that the attempt to speak while the lungs have so little air in them, that an interruption will arise from the necessity of a fresh inspiration, cannot fail to embarrass a person addicted to stammering. The practice inculcated, therefore, is in every respect commendable, and the suggestion of it highly meritorious.]

* Treatise on the Cause and Cure of Hesitation of Speech, or Stammering. Lond. 1828, 8vo.

SPECIES II.

PSELLISMUS BLÆSITAS.

MISENUNCIATION.

ARTICULATE SOUNDS FREELY, BUT INACCURATELY ENUNCIATED.

THE elementary articulate sounds, which the organs of speech are capable of enunciating, are but few ; and hence they are the same in all languages, which are alone founded upon them : differently, indeed, modified in several of them, and with a difference of number in still more : for diversities of language consist, not in different sets of articulations, to which the vocal organs are not competent, but only in their different modes of combination, and the different ideas which such combinations indicate. So seven notes comprise the whole of music, and, by their different arrangements, produce that variety of harmony which we admire in the works of Handel or Mozart. If we would ascend higher than eight notes, we only commence another series of like proportions. In the same manner, to quote the words of the author of *Hermes*, " it is only to about twenty-four plain elementary sounds that we owe that variety of articulate voices, which have been sufficient to explain the sentiments of so innumerable a multitude as all the present and past generations of men."*

The twenty-four plain elementary sounds, here referred to, are those which are denoted by the letters of the greater number of our European alphabets. Yet, of these, many are rather mere modifications of other sounds than distinct sounds in themselves ; insomuch that the ingenious Wachter has endeavoured to reduce the twenty-four to ten primary articulate enunciations, and to show, that these alone would be sufficient for the purposes of the most polished languages ; and, consequently, that an alphabet of not more than ten marks or signs might be sufficient to express its entire range.† In making this reduction, he regards all the five vowels as modifications of each other, or rather of one common articulation, the simplest belonging to the organs of speech, formed with least difficulty, and, on this account, composing a very great part of the languages of savage nations. In like manner, he regards all the gutturals as only modifications of another common articulation, as K, C, CH, Q, G, H. So B and P have nearly a common sound ; as have D and T ; and PH, V, and W. While L, R, S, M, and N, are distinct articulations, and will not readily blend with any others.

These, no doubt, might be sufficient for all the purposes of speech ; for we find, that ten simple numerals are adequate to all the purposes of arithmetical calculations, which extend to infinity ; and that able mathematician Tacquet, who has worked the problem for the purpose, informs us, that the combinations capable of being

GEN. VI.
SPEC. II.

Elementary articulate sounds few :
and the same in all languages :
chiefly diversified in number and import.

Amount to about twenty-four.

and are denoted by the letters of the alphabet.

The twenty-four reducible to ten.

How so reduced by Wachter.

So, ten numerals are sufficient for arithmetic.

* Book iii. chap. ii. p. 324.

† Nat. et Script. Concord., p. 64. Astle, *Origin and Progress of Writing*, p. 20.

GEN. VI.
SPEC. II.
Psellismus
Blæsitas.
Number of
combinations
capable of being
produced by
twenty-four
letters.

As the elemen-
tary sounds
differ in num-
ber in different
languages, so
must the letters
of their alpha-
bets.
Phœnician.

Samaritan.

Chaldean.

Hebrew.

Hence alphabets
for the most part
derived from
the Phœnician.

Some not, as
the Devanagari.

Its compli-
cation, yet
systematic ar-
rangement.

Something
ruder and
simpler must
have preceded.
Picture-
characters.

produced by the ordinary series of twenty-four letters, amount to not less than 620,448,401,733,239,439,360,000, without any repetition.* So that the richest vocabulary has made but a small inroad into that inexhaustible mine of wealth, which the wisdom of Providence has bestowed upon the few distinct and primary sounds, be they more or less, which the vocal organs of man are capable of articulating; thus devising a plan, which is equally entitled to our admiration for the simplicity of its design, and the comprehensiveness of its power.

I have observed, that some languages have more elementary sounds than others; and as these are expressed by elementary characters or letters, it follows, that some languages must also have a more extensive alphabet than others. The proper Phœnician alphabet, which is, perhaps, the oldest of which we have any distinct account, seems to have consisted of not more than thirteen letters at first; it had afterwards three added to it, making sixteen in the whole; and, in this state, it seems to have been earliest employed by many of the adjoining countries, and is distinguished by the name of the Samaritan, or ancient Hebrew: for the terms and characters of this last are so nearly those of the Phœnician in its improved form, that it is difficult and altogether unnecessary to make a distinction. The Chaldeans introduced some change into the shape of the letters, rendered them more elegant, and added six other letters, as the Samaritan alphabet did not seem sufficiently full to express all the articulations of their speech; and the Jews, during the Babylonish captivity, readily adopted the improvement, and have continued the Chaldaic characters in their writings ever since. And, in this manner, with various changes and augmentations, the Phœnician alphabet can be traced through every part of ancient and modern Europe, every region of Africa where writing of any kind is current, and the western countries of Asia.

Over a very extensive portion of this last continent, however, we meet with an alphabet that has no common origin, or conformity of principle with any hitherto described. This is the Nagari, or Devanagari, as it is called by way of pre-eminence. It consists of not less than fifty letters, of which sixteen are vowels, and thirty-four consonants, all arranged in the order of the alphabet, with a systematic precision that is to be found nowhere else. The vowels take the lead, beginning with those most easily uttered, and terminating with those that approach towards a consonant sound. The consonants then follow, in five regular series of gutturals, compounds, palatines, dentals, and labials; the whole closing with letters symbolical of sounds that do not exactly enter into any of the preceding series, and which may be regarded as a general appendix. This alphabet is asserted by many learned Brahmins to be of a higher antiquity than any other; and there can be no doubt, that it has a just claim to an exceedingly remote date. But its very perfection is a sufficient confutation to its having been invented first of all. Something far more rude and incondite must have preceded, and paved the way for it: and, in the complex characters of which it consists, we seem to have the relics of those emblematic or picture-symbols, which, there can be little doubt,

* *Arithmeticae Theor.*, p. 517. edit. Amst. 1704. Astle, ut supra, p. 20.

were first made use of; which are still employed by the Chinese and the uncivilised tribes of America, and seem to have laid a foundation for alphabetical characters in every quarter of the world. With a few trivial variations, this correct and elegant alphabet extends from the Persian Gulf to China; but it has no pretensions to rival the antiquity of the Phœnician. It is unborrowed, but of later origin.

Whatever be the number of simple articulations that enter into the constitution of a language, or however modified in enunciation, they can only be learned with accuracy in early life, when the vocal organs are most pliable, and the untutored infant is most prone to imitation. And hence, unless care be taken to imprint upon the organs of speech a just and correct enunciation of the first elements of words at this time, it is with great difficulty that the art can be acquired afterwards. This occurs to us under the best and most favourable circumstances. Foreigners coming into our own country after the age of thirty, though urged by an ardent desire of speaking English, seldom pronounce the language tolerably. An Englishman at the same age can hardly be taught to utter the guttural sound which the Welshman gives to the Greek χ , or even the French sound of the vowel u : and of the stray and solitary savages that have been caught in the forests of Lithuania, and a few other regions, there is not, perhaps, a single instance of their having been able, after the age of manhood, to articulate any language, so as to be understood with facility.

But we sometimes meet with less favourable circumstances to an acquisition of proper articulate sounds, and this too in a state of childhood, which is the immediate age of imitation. For, firstly, we sometimes see children, brought up under the care of those who have a vicious articulation themselves, from whom they will be sure to catch it; and hence those pronunciations and rude dialects that are so frequently found in the remoter and less polished districts of almost every extensive people. Secondly, we occasionally meet with some natural disability or want of harmonious power in the organs of speech themselves; one or two of them evincing a greater mobility than the rest, and consequently taking the lead of them, and interfering with their office. And, thirdly, there is, not unfrequently, a defect of structure in the organs of articulation, as a want or loss of the fore-teeth, or a fissure in the palate or the lips.

Many of the articulate sounds, moreover, in most, perhaps in all, languages, though called simple, are produced by the joint exertion of two or more distinct organs: and unless these organs precisely accord in flexibility and power, and are equally under the command of the will, the sound will be imperfectly imitated. The Arabic ع , and the Saxon ð or þ , in English expressed by *th*, is an articulation of this kind, being compounded of a dental and an aspirate or guttural sound. From early habit, the natives of both countries are able to enunciate it perfectly, and they enunciate it alike. But there is scarcely an individual in any other country, who can ever be taught to sound it accurately, unless he should have an opportunity of trying it in early life: for the motive powers concerned in the sound will not move in sufficient unison.

GEN. VI.
SPEC. II.
Psellismus
Blæsitas.

Simple articulations can only be accurately acquired in early life.

Hence the importance of giving a just enunciation in infancy.

And foreigners older than thirty, rarely attain the correctness of natives.

Peculiar difficulties to an acquisition of correct sounds.

Vicious enunciation in teachers.

Want of harmony in the organs of articulation.

Structural defect.

Many vocal sounds called simple, require the concurrence of two or more organs.

Example in the English *th*.

GEN. VI.

SPEC. II.

Psellismus
Blæsitas.The German
ch, and *sch*.The oporose
sounds are
themselves
often varied by
modifications.Hence provin-
cialisms and
dialects.Division of
articulate
sounds.

For the same reason, it is as difficult for a foreigner to catch the German *ch* in the pronoun *ich*, the *sch* in *schätzen*, or both in *schüdtlich*, or *schmächtigkeit*. But even these combined sounds have sometimes shades of distinction which constitute other sounds, and are expressly intended to do so; and, in such cases, the difficulty of an accurate enunciation is greatly enhanced. Thus the English *th* in *thing*, and in *thou*, is a different articulation; and the Arabians, who have both, express them by different marks or letters; for the sign of the first mode is *ث* and of the second *ض*, which, if expressed by our own letters, would, perhaps, be best written *dth*. And it is on this account, that where a common language spreads over different countries, as the Arabian, or different parts of a country, which formerly made use of a diversity of tongues, as the English, varieties will necessarily take place in the utterance; and the dialectic may be more in favour than even the original or normal enunciation. There are some persons, who prefer the English of Edinburgh to that of London; and the Arabic of Delhi, Ispahan, and Constantinople has modifications of sounds as well as of inflections, which, though regarded as barbarisms by a native of Cairo, are contemplated as excellences by those who make use of them.

The organ chiefly employed in the articulation of sounds, is the glottis; and subordinate to this are the fauces, the nostrils, the tongue, the lips, and the teeth. And hence the division of articulate sounds into VOWEL or VOCAL, which are formed by the glottis alone, and are the simplest of all sounds; GUTTURAL, or those which are formed in the fauces more or less acting conjointly with the glottis, of which the fauces are only a continuation, as *h*, *ch*, *q*, *g*, *h*; NASAL, as *m*, *n*, and the compound *ng*; LINGUAL, as *l* and *r*; LABIAL, as *b*, *p*, *f*, *v*, *w*; and DENTAL, as *c*, *d*, *t*, *z*.

If we were to be more particular than we have time to be, or than is necessary, it would not be difficult to derive very numerous examples of vicious enunciation, and consequently varieties of the species of morbid utterance before us, from every one of these divisions; but the following are the chief which occur in our own tongue, and those that are cognate with it:—

| | |
|-----------------|---|
| α Ringens. | Vicious pronunciation of the letter R. |
| β Lallans. | Vicious pronunciation of the letter L. |
| γ Emolliens. | Vicious substitution of soft for harsher letters. |
| δ Balbutiens. | Vicious multiplication of labials. |
| ε Mogilalia. | Vicious omission of labials, or exchange for other letters. |
| ζ Dentiloquens. | Vicious employment of dentals. |
| η Gutturalis | Vicious pronunciation of gutturals. |

α P. Blæsitas
ringens.

Explanation.

Cause.

THE VICIOUS PRONUNCIATION OF THE LETTER R is produced by a harsh or aspirated vibration or redoubling of it. Examples of this inelegance are common to several of the northern provinces of our own country, as it is to the ruder provinces of France. Among the Greeks, from the letter ε (*ro*), it was denominated rotacismus, and was common to the Eretrienses in the island of Eubœa. It is generally ascribed to the possession of too large and tardy a tongue. But it is rather produced by pressing the point of the

tongue downward towards the root of the teeth of the lower jaw, instead of upwards, with a slight vibration towards the palate.

In the SECOND VARIETY of vicious enunciation, the letter *l* is rendered unduly liquid, or substituted for an *r*. As when delusive is pronounced delūusive, as though the *l* possessed the power of the Spanish *ll*, or the Italian *gl*; or as when parable is pronounced palable. Alcibiades is said to have laboured under this defect. The Greeks, from the letter λ (*lambda*), denominated this *lambdacism*; the Romans, with more severity, *lallatio*, or *lullaby-speech*. This is often the result of affectation; sometimes, perhaps, from not having the tongue sufficiently free, as where there is too great a breadth of the frænum which ties it to the base of the mouth, or too large and oppressive a flow of saliva. As the articulation of *r* does not enter into some languages, as those of Mexico and China, the *l* is often substituted for it; hence the Jews of the former country, who, from long disuse, have lost the power of pronouncing the *r*, employ the *l* in its stead; and for אשרי האיש אשר in the opening of the first psalm, read אשלי האיש אשר.

In the NEXT VARIETY the harsh letters are viciously dropped for softer; as in the substitution of anzel for angel; capidol for capitol; dat for that. This may be the result of a debilitated articulation in children who have been brought up too daintily; but it is more usually the result of affectation; or is founded upon a general principle of softening the rougher or harsher sounds of a language into a smoother and more limpid flow; as is the case with most of the modern dialects of the south of Europe, and particularly those of Italy and Spain, which are well known to be derived from the Latin. Thus in the former we have piano for plano; piangere, and still further piagnere, for plangere, and egli for ille: and in the latter llamar, for clamare; llaga, for plaga, and hermosa, for formosa.

It is curious to observe how, in this respect, the most barbarous and the most polished languages agree. It is generally, but erroneously conceived, that the former are peculiarly harsh and dissonant; for savages, in speaking, as in any other exertion, take no more pains than are absolutely necessary, and hence content themselves with the soft and simple vowel sounds, or those of the glottis, drawled out indeed at too great length; and when they are driven to the use of consonants, select those that give them least trouble to enunciate. On this account Lord Monboddo is correct in observing that "the words of barbarous languages are long, and full of vowels; not short, and full of consonants, as has been imagined."* And the following remark of my excellent and distinguished friend Dr. Perceval of Dublin, in the manuscript commentary with which he favoured me on the volume of Nosology, already spoken of in the Preface, is peculiarly in unison with this statement:—"In a paralytic affection of the organs of articulation, the patient pronounced the word cocoa, toto. The Otaheitans call Cook, Toote. Their language is beautifully soft and vocal. A sentence, reported in Cook's second voyage, is distinguished by the harmonious and expressive collocation of its words: 'Tootaha, taio Toote—mutte Tootaha.'—Tootaha, the friend of Cook

GEN. VI.
SPEC. II.

β P. Blæsitas
lallans.

Explanation.

Cause.

γ P. Blæsitas
emolliens.

Explanation.

Comparison of
the most polished
with the
most barbarous
tongues.

Softness of the
Otaheitan
language.

* Origin and Progress of Language, second edit. vol. i. b. iii. p. 496.

GEN. VI.

SPEC. II.

γ P. Blæitas
emolliens.δ P. Blæitas
balbutiens.Explained.
Examples.Often used by
infants.Hence the
names of *papa*
and *mamma* as
altered from the
original
Hebrew.Multiplication
of harsh labials.Other examples
in persons la-
bouring under
intoxication.In persons with
broad thick lips.

— dead is Tootaha." Man in savage life is fond of ease, and would not move a muscle if he could help it; in the voluptuousness of polished life he loves it equally, and is, if possible, still less disposed to exertion; and hence this extraordinary accordance in the character of their articulations.

In the BALBUTIENT VARIETY, we have the labial letters too frequently repeated, or enunciated too harshly, or used instead of other letters. The Welch are proverbially addicted to this inelegance, by confounding the *v* with the *f*, and the *b* with the *p*; of which Sir Hugh Evans, in the Merry Wives of Windsor, affords a correct and amusing example: — "*Ferry goot*," says he, "I will make a *prief* of it in my note-book!" So *impringe* is often used for *infringe*, and *ibory* for *ivory*. And thus *Veda* is pronounced *Beda*, and *Venares* *Benares*, in Bengal, the Bengalee having no such letter or articulation as *v*.

Infants before they cut their teeth are constantly using labials too freely, as the lips press together without resistance; and hence they delight in iterating the same labial sound; and it is from a copy of such infantile iteration, that we derive the names of *pa-pa* and *ma-ma*, which they first learn to utter: for the original Hebrew terms, from which these names have descended to Europe, and, indeed, to most other parts of the world, savage as well as civilised, are without any iteration whatever, being simply אב (*ab*) אמ (*am*); the first importing *love*, and the second *sustenance*; in Syriac rendered אב or אבא (*aba* or *abba*), and אמה (*ama*); and the same in Chaldee: whence the Greek terms and their correlatives πάππας or μάρμα (*pappa* or *pappas* and *mamma*), produced by a mere infantine balbutiation, or substitution of *p* for *b*, in the first term, and a reduplication of the consonant in each: and hence, too, *am-o*, and *am-or* in Latin.

Persons in a state of intoxication, from the tremulous debility of their lips, often exhibit the same reduplication of the labial sounds; and thus make an approach towards one of the varieties of the last species. It is also often to be found in persons whose lips are unduly thick and broad, a deformity distinguished vernacularly by the name of blobber-lipped: to which cause Quintilian, who notices this variety of vicious expression, chiefly ascribes it, and hence distinguishes it by the name of plateiasma, probably from Theocritus:

Τρυγόνες ἐκκναισεῦντι πλατυδόσοιαι ἕπαντα. *
Cooing like pigeons with your blobber lips:

A verse designed to ridicule the Doric dialect, and consequently intimating that this kind of vicious enunciation was common to a considerable part of Achaia.

ε P. Blæitas
mogilalia.Explanation.
Examples.

The erroneous articulation constituting the NEXT VARIETY, is of a character precisely opposite to the preceding; and consists in omitting the harsher labials altogether, or exchanging them for others that are softer and more easily uttered.

Thus *mantle* is broken down into *antle*, *fish* into *vish*, and *pilfer* into *filfer*. So in the Spanish the Latin *farina* becomes *harina*,

* Idyl. xv. 88.

and *faba*, *hava*, and in French the Latin *sibilo*, *siffler*. This blemish is especially common to those who are hare-lipped, or have any other kind of defect in either lip, so that the two will not play in harmony; and more particularly still, if any of their front teeth be wanting.

GEN. VI.
SPEC. II.
ε P. Blæsitas
mogilalia.

In the DENTILOQUENT VARIETY, the dental sounds, as of *c*, *s*, *t*, *z*, are too frequently employed, producing the effect of what is called lisping, or, in common language, speaking through the teeth. This, also, is often an affected blemish, as though it were an elegance, instead of a fault in enunciation. It is produced by having a tongue naturally too long, and hence perpetually thrust against the front teeth from necessity, and from a habit of pressing it in this direction too frequently.

ζ P. Blæsitas
dentoquens.

Explained.

The GUTTURAL or PALATINE LETTERS, as *g*, *h*, *j*, *c*, *x*, are sometimes uttered imperfectly, by being introduced where they ought not, or withheld where they should be distinctly enunciated; and in this consists the last variety it may be necessary to notice.

η P. Blæsitas
gutturalis.
Explained.

One of the most common examples is in the superfluous use of the aspirate, or *h*, by means of which exalt and exasperate are pronounced *exhalt* and *exasperate*; so collar is called *khollar*, and custom *khustom*. And not unfrequently among men of unfinished education, the aspirate is just as uniformly omitted where it ought to be employed, as employed where it ought to be omitted; whence for this sentence "the upper part of the house is to be let unfurnished," we have "the *h*upper part of the ouse *h*is to be let *h*unfurnished." And if the palate be fissured, or in any other way imperfect, "ghost" is pronounced "host," "jolly," "iolly," or "yolly," "coffee," "dhoffee," "Xerxes," "Zherzes."

Examples.

Where these defects depend on organic misformation, they will mostly be found without a remedy, though they may be palliated by a laborious discipline. Where they are the result of debility or vicious habit, the remarks, with which we closed the preceding species, will be equally applicable here.

Remedial
intentions.

CLASS II.

PNEUMATICA.

ORDER II.

PNEUMONICA.

AFFECTING THE LUNGS, THEIR MEMBRANES OR MOTIVE POWER.

THE RESPIRATION IRREGULAR, IMPEDED, OR PAINFUL.

CLASS II.
ORDER II.

THE idiopathic diseases, that appertain to this order, differ very widely in their respective degrees of severity and danger; and, upon the whole, are but few; though the number is very considerable in which the lungs and their auxiliary powers are deeply implicated, by sympathy or continuity, in disorders that originate in other organs, and primarily affect other functions.

The genera are as follow:—

| | |
|-----------------|--------------------------|
| I. BEX. | COUGH. |
| II. DYSPNŒA. | ANHELATION. |
| III. ASTHMA. | ASTHMA. |
| IV. EPHIALTES. | DAY-MARE. NIGHT-MARE. |
| V. STERNALGIA. | SUFFOCATIVE BREAST-PANG. |
| VI. PLEURALGIA. | STITCH. |

GENUS I.

BEX.

COUGH.

SONOROUS AND VIOLENT EXPULSION OF AIR FROM THE LUNGS.

GEN. I.
Bex as a
generic name
preferred to
tussis.

THIS genus of diseases was by the Latins named TUSSIS, a term that has been more generally employed by nosologists than any other. I have ventured, however, to restore the Greek name BEX (ΒΗΞ) for the sake of uniformity; so that the generic terms may all be derived from a single tongue.

Cough, defined as above, is well known to accompany, as a symptom, a great multiplicity of other affections, some of which are very remote from the seat of coughing. Thus it occurs to us in pleurisy, in pneumonitis, hepatitis, paristhmitis, empyema, asthma, catarrh, phthisis, hæmoptysis, hysteria, helminthia, and dropsies of various species. Hence Dr. Cullen has omitted cough as an idiopathic affection, and has only introduced it as a symptom or synonym of catarrh; although it belongs at least as much to phthisis, and perhaps to every one of the diseases just enumerated: but Dr. Cullen's system did not allow a place for cough as a primary disease; and in this, as in various other cases, he was obliged to bend to the force of necessity.

Cough, undoubtedly, occurs in its most frequent appearance as a symptom of some other complaint; but it is at times as truly idiopathic as any complaint whatever, and ought to be treated of as such. Under this form, its seat is in the chest; and the parts principally affected are the trachea, bronchiæ, the membranes, and substance of the lungs. In the act of coughing, the lungs, like the stomach in vomiting, continue inert; and the active or convulsive part, by which the lungs are emptied, is performed by the muscles of respiration.

"It is not necessary," observes Mr. John Hunter, "that the stomach should act violently to produce the evacuation of its contents; nor is it even necessary that it should act at all: for the lungs themselves do not act in the least when any extraneous matter is to be thrown up: and coughing is to the lungs what vomiting is to the stomach. The muscles of respiration are the active parts in emptying the lungs, and can act naturally and preternaturally. The action of vomiting is performed entirely by the diaphragm and abdominal muscles; and we know by the same action that the contents of the rectum can be expelled."* In the Physiological Proem to the present class, I have endeavoured to establish this remark in respect to the lungs; and, under the species *EMESIS*, in the preceding class, I have noticed experiments of M. Magendie that confirm Mr. Hunter's opinion in respect to the stomach.†

Generally speaking, idiopathic cough is not dangerous in itself, or while running its regular course; but it has often proved highly dangerous in its results, by superinducing peripneumony, hæmoptysis, hectic fever, or phthisis.

The whole of these remarks apply not more to common coughs, than to pertussis or hooping cough: which unquestionably, therefore, ought to be arranged as a species under the present genus. In truth, the commencement of both is in most cases so much alike, that it is often impossible, and always difficult, to distinguish them. Both are, in many cases, accompanied with a slight degree of fever; the most obvious and assignable cause of both is cold; I mean, where the hooping-cough is original; and in both, the sonorous fits, how much soever they may differ in violence and a few other circumstances, are produced by a spasmodic action of the same muscles.

GEN. I.

Bex.

Common as a symptom to many other complaints.

Hence regarded by Cullen as symptomatic alone.

Yet at times truly idiopathic.

Seat and part affected.

Lungs inert in coughing, as the stomach in vomiting.

Acted upon by the muscles of respiration.

Rarely dangerous in its regular course; but often so in its results.

Hooping-cough properly ranged under the present genus.

* Anim. Economy, p. 199.

† The opinions of various other physiologists on the mechanism of vomiting will be found at p. 7. and 129. of the present vol.

GEN. I.
Bex.

Thus explained, the genus *bex* or *tussis* may be divided into the three following species:—

- | | |
|-------------------------|------------------------|
| 1. <i>BEX HUMIDA.</i> | COMMON OR HUMID COUGH. |
| 2. — <i>SICCA.</i> | DRY COUGH. |
| 3. — <i>CONVULSIVA.</i> | HOOPING-COUGH. |

SPECIES I.

BEX HUMIDA.

COMMON COUGH. HUMID COUGH.

THE COUGH ACCOMPANIED WITH AN EXPECTORATION OF A MUCOUS OR SEROUS FLUID.

GEN. I.
SPEC. I.
How called by
the Greeks.

To this species the Greeks gave the name of *anaptysis*, and *anacatharsis*; which last has been copied by Sauvages, and appropriated to the present purpose. The species affords us four varieties; one *entonic*, or accompanied with an excess of power, and three *atonic*, or distinguished by enfeebled action.

- | | |
|----------------------------|---------------------------|
| α <i>Mucosa.</i> | Common mucous cough. |
| β <i>Anhelans.</i> | Chronic cough of old age. |
| γ <i>Acrida.</i> | Frothy saline cough. |
| δ <i>Periodica.</i> | Nervous cough. |

α *B. humida*
mucosa.

The bronchial
vessels become
overloaded.

In the FIRST VARIETY, the discharge is chiefly mucous, and excreted freely. The exhalants of the bronchiæ are stimulated by an irritation of some kind or other, frequently by a reverse sympathy, in consequence of cold and torpid feet, to act more powerfully than in a state of ordinary health, whence the bronchial vessels become overloaded, and relieve themselves by an expectoration, that takes place freely, and without the hoarseness which usually accompanies catarrh, or any other very troublesome disturbance of the respiratory organs.

β *B. humida*
anhelans.

Bronchial secretion less than in ordinary health, but more tenacious. Common to advanced life, and those who have neglected mucous coughs.

γ *B. humida*
acrida.

There is another variety, commonly called the CHRONIC COUGH OF OLD AGE, which occurs in long paroxysms, with a viscid and mucous discharge, excreted with difficulty and laborious breathing. Here the bronchial secretion of mucus is perhaps less copious than in ordinary health; and, being peculiarly tenacious, is thrown up with great labour and repeated efforts. This kind of cough is particularly common to persons in advanced life; or whose lungs, or bronchial vessels, are rendered weak and irritable from a neglect of common mucous coughs; which have at length run into the present variety, and become almost habitual; showing themselves on every change of the atmosphere; and particularly during the inclemency of winter.

In the THIRD, or ACRID VARIETY, the fluid coughed up is thin, frothy, and saline; and for the most part excreted with difficulty. It is evidently, like the last, an atonic affection of the lungs; though often produced by diseased action in some remote organ with which the lungs associate. It is hence sometimes found in trans-

ferred gout, and still more frequently in cases of diseased liver ; especially where the liver has been affected from a habit of ebriety ; and, in these cases, it is peculiarly troublesome on first rising from bed in the morning. There is, as I suspect, in this form of humid cough, not only great torpor and imbecile action in the mucous membrane of the lungs, but a depraved secretion, small in quantity, and thinner and more acrid in quality than it ought to be.

This cough is sometimes extremely pertinacious. Dr. Darwin tell us, that he met with it twice in the same person, at a distance of some years, during a fit of gout, so intractable as to resist venesection, opiates, bark, blisters, mucilages, and all the usual methods. It was, for a time, supposed to be the whooping-cough, from the violence of the spasmodic fits of coughing : it continued two or three weeks, the patient never being able to sleep more than a few minutes at once during the whole time ; and never for a moment, unless propped up in bed with pillows.*

There is another variety of the present species to be met with, which develops a striking tendency to recur at STATED PERIODS. The cough, instead of being violent, is here partly restrainable, and the discharge, though thin, is not acrid. It is the NERVOUS COUGH of Dr. Whytt, who, in his Treatise on Nervous Diseases, has described it with great accuracy and judgment. It is a frequent attendant upon persons of a nervous or irritable temperament, and hence common to the hysteric, dyspeptic, and choleric. Like the last variety, it is also occasionally found in repelled gout. There seems here, also, to be some depravation in the nature of the secretion, dependent on the debility of the secreting organs. And hence we sometimes find, that the morbid phlegm forms a nidus, as in various cases of phthisis, for the eggs of minute insects floating in the atmosphere, which are conveyed with the inspired air to the bronchial vessels, where they are hatched in the secreted fluid, and often thrown up in the shape of larvæ or maggots. In like manner, we sometimes meet with hydatids formed and thrown up in the same way ; of which we have a singular example in the Medical Transactions, in a lady, thirty-seven years of age, of a delicate constitution, and nervous or hypochondriacal habit. For half a year, she expectorated more or less of these in the midst of thick viscid phlegm, sometimes to the amount of twelve, fifteen, or twenty-four in a day, of various sizes, from that of a pea to that of a pullet's egg.†

From the difference of causes and symptoms which these varieties evince, a very different mode of treatment is evidently required.

The first variety, produced by excess of action in the mucous membrane of the lungs, and mostly by sympathy with a remote organ, as in the case of cold and torpid feet, will be best relieved by diaphoretics and the warmer sedatives ; and especially the compound powder of ipecacuanha, which will restore to the system its harmonious balance of power. The warm bath, or bathing the feet in warm water ; warm and copious apozems, and oily or muc-

GEN. I.

SPEC. I.

γ B. humida
acrida.

Character.

A disease of
debility.The secretion
probably de-
praved.Peculiarly
pertinacious ;
and from its
violent and
spasmodic fits
resembling
whooping-cough.δ B. humida
periodica.Common to
those of a ner-
vous and irrit-
able habit.Secretion pro-
bably depraved.Forms a nidus
for the eggs of
insects.Treatment of
humid cough.

Diaphoretics.

Warm bath.

* Zoonom., Class IV. ii. 1. 9.

† Dr. Elliotson, in his Lectures at the London University, mentions a case, which he met with, where a communication was formed between a cyst full of hydatids, and the air passages, so that the patient was in the habit of coughing up hydatids for some time before she died. — Ed.

GEN. I.
SPEC. I.
Bex humida.
Demulcents.
Tartar-emetic
in large and
frequent doses.

lagnous demulcents, are also peculiarly adapted to this species of cough. At the same time, the bowels should be kept open by any gentle laxative, as the neutral salts, or the confections of cassia or senna.

On the continent, it has lately been a very popular practice to employ tartar-emetic in preference to ipecacuan, whether alone or combined with opium, as in the compound powder. It has been given in all complaints of the chest attended with defluxion, and in all possible proportions: in some instances, so diluted with water as to form a part of the common beverage; and, in others, so concentrated as to rival our boldest wholesale prescribers of calomel. This is especially the practice of the supporters of the contra-stimulant Italian school. Thus Rasori has given a gradual increase of tartar-emetic, to the amount of two drachms a day; and, according to his account, without producing vomiting, except in the first instance. He adds, that when the patient gets better, the emetic property again comes into operation, and the remedy is left off. M. Peschier of Geneva has imitated this innovation. He declares bleeding to be useless, and that he cures all fluxions of the chest with tartar-emetic alone, which he gives in doses of fourteen grains in the day, without producing vomiting. And Dr. Duffin has lately informed us, that he swallowed from twenty to twenty-five grains of tartarised antimony by mistake, but without suffering from any remarkable symptom. From all which we may learn, I fear, that, in the present day, the powers of experiment are more widely afloat, than the powers of judgment and sobriety.

Expectorants,
Proper mean-
ing of the term.

In the disease before us, we have also reason to expect benefit from many of the expectorants, properly so called; those medicines, which rather promote the separation of the viscid phlegm with which the bronchiæ are loaded, than simply inviscate or dilute it, though these are also treated of as expectorants by many writers.*

Principle on
which they act.
Probably a
specific deter-
mination to the
lungs.

The list of the proper expectorants employed formerly was very voluminous; in the present day, they are comparatively but few, and the proscription has, perhaps, been carried too far. The principle upon which they act is, in some degree, doubtful. The simplest way of accounting for it, is, by means of a specific determination to the lungs. For, as we have pretty clear proofs of medicines operating specifically upon other organs, as that of mercury upon the salivary glands, and cinchona upon the irritable fibre, there is no reason why we should not expect a like operation upon the viscera of the chest. Dr. Cullen is quite at a loss upon this subject, from not admitting of specific medicines, or a specific action upon any organ. As a general rule, he supposes expectorants to operate on the bronchiæ merely by a diaphoretic power, or that of increasing the flow of the superficial exhalants at large, and consequently of the exhalants of the lungs, by which the mucus present in the follicles may be poured out in a less viscid form, and hence in a state to be more easily thrown up by the trachea.

Cullen's hypo-
thesis objected
to.

* Expectorants are usually defined to be medicines, which promote the excretion of mucus and fluids from the surface of the lungs and trachea. The reader will find an admirable chapter on the principles of their operation in Professor A. T. Thomson's *Elem. of Materia Medica*, vol. ii. p. 137. — Ed.

But this is a very unsatisfactory view of the question. For, first, admitting that some medicines act directly upon the exhalants of the skin, a specific power is hereby immediately conceded to one set of organs; and if such a power exist in respect to one set, there is no reason why it may not in respect to fifty. Next, we see evident proofs of an expectorant power in many medicines, as in gum-ammoniac, where we have no proof whatever of increased exhalation from the surface of the body. And, further, the general explanation gives us no clue to the different operations of particular expectorants.

It is possible, that in all these there is a peculiar stimulus; but whether this depends upon any sensible quality they possess, we cannot easily determine: for though many of them are more pungent to the taste than others, their degree of expectorant power does not in every instance keep pace with their degree of pungency.

In the variety, however, of a common mucous cough from cold, it is obvious, that, where expectorants are employed, they should be of a mild, rather than of an acrimonious nature, as we have already an excess of action to encounter. And hence honey, the rob or jelly of the sub-acid fruits, as currants or raspberries, liquorice-root, and perhaps hyssop, butterbur, and inula, may be used with advantage, though the virtues of the last two or three are but doubtful, notwithstanding the high repute in which they were held formerly. The official inula of our own day, however, does not appear to be that of the Latins; for among them its farina is represented as having been particularly sapid; so much so, indeed, as to have formed a favourite ingredient in the most celebrated sauces of their public feasts. Horace speaks of it in one place as possessing a bitter taste; for he thus makes an epicure boast of having invented the sauce:—

—INULAS ego primus AMARAS
Monstravi incoquere.*

And in another he describes it as acrid, or stimulating; for it is probably in this sense that the ACIDAS should be understood:—

—ACIDAS mavult inulas.†

While Lucretius makes it rather a mild general stimulant, or aromatic:—

— quæ
TITILLARE magis sensus, quam lædere possint,
Fæcula jam quo de genere est, INULÆQUE saporēs.‡

But let the quality of the Roman inula be what it may, we do not seem to possess the plant in the almost tasteless and inert root, employed under this name in our own day.

In the second variety, or chronic cough of old age, where the mucous discharge is peculiarly viscid, much smaller in quantity, and excreted with great difficulty and laborious breathing, and the general symptoms evince great torpor of the extreme vessels of the lungs, the warmer and more pungent expectorants can alone be of

GEN. I.
SPEC. I.
Bcx humida.

Expectorants
probably pos-
sess a peculiar
stimulus.

In mucous
cough the
milder to be
preferred.
Treatment of
B. humida
mucosa.

Whether the
inula of modern
medicine be
that of the
Romans in
their condi-
ments.

Treatment of
B. humida an-
helans.

Warm and
pungent expec-
torants.

* Sat., lib. II. viii. 51. † Sat., lib. II. ii. 44. ‡ De Rer. Nat., ii. 430.

GEN. I.

SPEC. I.

Treatment of
B. humida an-
helans.

Alliacea.

Gum-resins.

Tar.

Acidum abietis.

Treatment of
B. humida
acrida.Need not es-
sentially vary
from the pre-
ceding.Narcotic bitters
and simple
narcotics.When symp-
tomatic the
primary disease
to be attended
to.Narcotics rarely
to be employed.Demulcents of
no use.Tonics advis-
able, both
vegetable and
metallic.Zinc, once too
highly, now
too little es-
teemed.

Prussic acid.

any service, as the alliacea, and stimulant gum-resins, especially ammoniac, benzoin, styrax, and, perhaps, all the turpentine modifications.

Tar-water was at one time a famous remedy ; but has long fallen into great disesteem. From its warm terebinthinate impregnation, and the approach it makes to camphor and the gum-resins just enumerated, it may doubtless prove serviceable in many cases. It is for the same reason that the vapour of tar, exhaled from a tin pan with an oil or spirit-lamp beneath, as recommended by Sir Alexander Crichton in phthisis, is, in the present cough, frequently employed with advantage. The *acidum abietis*, another old preparation of the same kind, seems, however, to be the most deserving of trial of all the terebinthinate forms, and has sunk into disrepute without reason : it is the peculiar acid liquor, yielded along with the essential oil, in distillation of the fresh branches or fruit of the *pinus sylvestris* and *p. alba* of Linnæus. It is too acrid to be drunk alone, and is usually diluted with water : and combines in itself some portion of the terebinthinate oil with an acid very nearly resembling the acetous.

The same tribe of medicines will generally be found useful in the third variety, or that in which the cough is followed by a thin frothy and saline excretion ; for here we meet with as much local atony and torpor of the excretories as in the preceding. We may here also with advantage employ several of the narcotic bitters, and especially the hop, in the form of pills or tincture ; and occasionally the narcotics themselves, as opium, or hyoscyamus, or the extract of the common potato, *solanum tuberosum*, as recommended by Dr. Latham.* But where the cough is dependent upon morbid affection of some remote organ, and the lungs are only influenced by sympathy, as is often the case in chronic hepatitis, it is obvious, that our chief attention should be directed to the primary disease.

In the nervous or periodic cough, narcotics should be employed very cautiously, and only where the irritation is perpetual, or otherwise unconquerable ; demulcents will also be of no service. Though the warmer expectorants may be useful, our chief dependence must be on general tonics, as the columbo, cusparia, and cinchona, with which may be combined several of the metallic oxydes, especially those of bismuth and zinc. When the flowers of zinc were in the height of their popularity, they were supposed to be an unfailing remedy ; and Dr. Percival, of Manchester, has given numerous examples of their complete success. By having been too highly advocated, this medicine has now fallen into an undue degree of disesteem. Camphor and ammonia will often prove palliatives for the cough, and may be occasionally had resort to ; but moderate exercise and change of air should uniformly make a part of the tonic plan, wherever the patient's means will allow.

In this modification of cough, more than in any other, we have reason also to expect benefit from a cautious employment of the prussic acid, which has the peculiar power of diminishing the general sensibility, without affecting the functions of respiration or circulation. Of all the cases, published by Magendie and Brera, in proof of its beneficial qualities, none are so decisive as those of

* Med. Trans., vol. vi. art. 6.

chronic and nervous coughs. * Six drops of the acid, prepared according to Scheele's method, may be given in a wine-glass of infusion of cusparia every four hours.

GEN. I.
SPEC. I.
Treatment of
B. humida
periodica.

SPECIES II.

BEX SICCA.

DRY COUGH.

COUGH UNACCOMPANIED WITH EXPECTORATION.

THE symptom in the definition sufficiently shows, that the seat of the disease is here, either in a remote organ or in the parenchyma, or general substance of the lungs, rather than in the mucous membrane of the bronchiæ. The disease is commonly, indeed, produced by some irritable substance generated within the lungs, as in the case of a scirrhus or calcareous affection of these organs; or conveyed into them from without, as is common to glasscutters, hewers of free-stone or sand-stone, workers of metals, and similar mechanics, in consequence of the finer particles of the materials, on which they operate, being occasionally inhaled with the inspired air, and afterwards making their way through the delicate tunics of the air-cells.

The dry cough is also at times to be traced to a remote irritation, as that of worms, or an inflammatory action in the intestines, liver, or other abdominal organs: in most cases, the lungs themselves are probably quite passive, and only yield to the propulsive action of the diaphragm, and its auxiliary muscles, to which the remote stimulus seems to confine its sympathetic power.

The minute and invisible eggs of various insects floating in the atmosphere, are also sometimes swallowed in like manner, and in a few instances hatched into larvæ, which have been thrown up by coughing.† Minute pieces of bone, and the kernels of cherries and other fruits, have, moreover, occasionally slipped into the trachea accidentally; and, after exciting great irritation and a hard dry cough for a considerable period of time, have ultimately been thrown up. A bean, in this manner, dropped into the trachea, was rejected on the fifth day in a violent fit of coughing.‡ It is more

GEN. I.
SPEC. II.
Seat of the
disease.
Causes.

Often produced
by a remote
irritation.

Sometimes by
minute eggs
inhaled with
the air.

By edible substances that
have slipped
down by mistake.

Singular discharge of substances that
have not entered by the
mouth.

* Recherches Physiologiques et Cliniques sur l'emploi de l'Acide Prussique ou Hydro-cyanique dans le Traitement des Maladies de Poitrine, &c. Par F. Magendie, &c. 8vo. Paris, 1819. Under the name of *spasmodic cough*, Dr. Elliotson refers to a cough, that comes on in long and violent paroxysms, and occurs in adult subjects: if united with inflammation, it is out of all proportion to it. In this disease, he has found the carbonate of iron the best remedy, sometimes preceded by bleeding, if the patient be robust. (Lect. at London University.) The carbonate of iron might be tried in the chronic cough of elderly persons. — Ed.

† Bartholin. Act. Hafn. iv. obs. 46.

‡ Beaussier de la Bonchardiere, Journ. de Med., xlv. p. 267.

GEN. I.
SPEC. II.
Bex sicca.

extraordinary that materials, introduced into or engendered in wounds in the thorax, should at times be found to work their way into the bronchial vessels, and in like manner be thrown up by coughing. Yet in this way have been discharged surgical tents that have slipped beyond the lips of the wound*; and the splinter of a fractured rib.†

The varieties chiefly worthy of notice are the three following :

- | | |
|--|--|
| <p>α Ingenerata. From ingenerate irritants.</p> <p>β Extranea. From extraneous irritants.</p> <p>γ Verminosa. From remote worms or vermicules.</p> | <p>From irritation produced locally, as a scrofulous, scirrhus, or calculous affection of the lungs.</p> <p>From irritating materials inhaled from without, as in various operations on glass, metals, sandstone, and marble.‡</p> <p>From some remote irritation, chiefly that of worms burrowing in the intestines, liver, or other abdominal organ.</p> |
|--|--|

General remarks and treatment.

When produced by worms.

Scrofulous state of the lungs.

Of these, the LAST is only to be removed by removing the primary disease. It is most common to children, and has the associate signs of a tumid belly, and pale emaciated countenance. For the medical treatment we must therefore refer to the genus HELMINTHIA, in the preceding class.

When the irritation proceeds from a SCROFULOUS or CALCULOUS AFFECTION of the lungs themselves, our attention must be directed to the peculiar diathesis, on which the disease is dependent. In the former case, small doses of the milder mercurial preparations, combined with the usual narcotics of the lurid and umbellate orders, as conium Ceanthe (dropwort) hyoscyamus, and solanum, may afford local relief by their narcotic and alterative power: while the general state of the system should be subjected to the regulations, which will be found laid down under the diseases STRUMA and MARASMUS *Phthisis*, in the ensuing class.

Calcareous deposit.

Acid inhalations.

Osthetic diathesis.

The deposit of calcareous matter in the substance or air-cells of the lungs, may be the result of a morbid affection confined to the lungs themselves; for we often find them loaded with a deposit of this kind, while all the other viscera are in a state of health; or it may proceed from a calcareous diathesis, of which we shall have to treat more at large under the genus OSTHETIA, in Class VI. Order I. of the Nosological Arrangement. In the former case, acid inhalations, or fumigating the chamber with the vapour of tar, which always contains a portion of acid, after the manner proposed under the preceding species, will afford a prospect, not merely of temporary relief by their tendency to dissolve the calcareous deposit, but probably of more permanent benefit, by changing the nature of the morbid action.

Where the formation of calcareous matter appears to depend

* Tulpius, lib. ii. c. 15. — Fabric. Hildanus, cent. i. obs. 46. cent. vi. obs. 22.

† Hildan. ex Pigray., Ep. 51.

‡ Diemerbroeck, Anat., lib. iii. cap. 13. — Rammazzini, &c. Morb. Artificum, cap. 26.

upon an osthetic diathesis, or a constitution prone to generate lime, diluting apozems drunk freely will be serviceable; and particularly a very free beverage of aerated mineral waters; which, while they dilute, will tend to invigorate the system generally, and produce a beneficial change upon the habit. Where calculi are disposed to form in the kidneys or bladder, Dr. Russell has recommended a very liberal use of sea-water; De Haen of lime-water, of which he tells us, that, in one case, not less than fifteen hundred pints were drunk with very essential advantage. Many foreign physicians advise the continental mineral springs, as those of Pymont, Carolina, and Barèges: while other pathologists have found large quantities of pure water, hot or cold, prove as good a palliative or remedy: in all which we trace out one common principle, which is that of dilution, and we can trace out nothing else. A warm climate, which proves a perpetual diaphoretic, and urges perpetually to the surface, will also in all probability be found serviceable; and, above all things, pure air and as brisk exercise as the patient can bear without fatigue, so as to strengthen the system, and at the same time keep the skin soft and moist.

Mechanics engaged in working on metals, glass, freestone, or any other material, minute particles of which are apt to fly about and impregnate the atmosphere, and pass by inhalation into the lungs, should be peculiarly careful to keep their mouths and nostrils covered with a handkerchief. And if the lungs be irritated with sharp spiculæ, and a distressing and chronic cough be excited, all similar labour must be abstained from; the diet be peculiarly light; emetics be frequently administered; and, in the interval, diluting apozems be used copiously, with bland demulcents. And if, by these means, we can check the irritation for some weeks or months, the lungs will often, by a growing habit of exposure to its cause, cease to be materially affected by it; and the patient may pass through life without much inconvenience. But if hereby we should not be able to succeed, inflammation, hemorrhage, or phthisis, will probably be the result.*

In this variety, we have also great reason to expect benefit from the use of mild expectorants and demulcents.

Of the nature and operation of expectorants I have spoken already: and as there is no complaint, in which demulcents can be employed to more advantage, and few in which they will prove so pleasant and tranquillising, let us digress for one moment to examine into their nature and operation.

Demulcents are medicines that obtund the action of acrid or spicular materials, not by changing their acrimony, but by covering them with a viscid and inirritant fluid. They are of two sorts, mucilaginous and oily; and of the manner in which they act, when

GEN. I.

SPEC. II.

Bex sicca.
Treatment.Diluents drunk
freely.Sea-water
drunk freely.
Lime-water.Simple hot
water.A warm
climate.

Brisk exercise.

Acrid particles
inhaled by me-
chanics: hence
caution neces-
sary in their
respective
callings.

Emetics.

Lungs less af-
fected from
habit.Expectorants
and demul-
cents.Nature of de-
mulcents.Their effect
two-fold.

* Though various morbid affections of the lungs are imputed by Dr. Good, with many ancient and modern pathologists, to the inhalation of dust and other extraneous particles by several descriptions of workmen in their different employments, the correctness of the doctrine is denied by Professor Laennec (*On Diseases of the Chest*, &c. ed. 2. p. 137. transl. by Dr. Forbes), whose arguments, however, turn chiefly on the escape of some individuals from the mischief, though exposed to the suspected cause, and on the fact of dust taken into the lungs being expectorated afterwards with the mucous secretion of the bronchiæ. Both these circumstances are true, and yet the temporary or partial lodgment of the extraneous matter may give rise in many instances to pulmonary disease. — ED.

GEN. I.
SPEC. II.
Bex sicca.
Treatment.
By what means
they act.
Hypothesis of
Cullen.

applied to the surface of the body, there is no doubt whatever. But, by what means they are able to retain their inviscating power, when passing through the stomach to a remote organ, is far less clear, and has been a source of considerable controversy. Where the irritation is in the lungs, as in the case before us, it has been supposed by many writers, and especially by Dr. Cullen, that by swallowing these substances leisurely, as we necessarily besmear the fauces and upper part of the glottis, we directly take off all irritation from these organs: and that the quietism hereby produced in the upper extremity of the trachea, is propagated by sympathy through the whole of the bronchial ramifications and the air-cells of the lungs; and that it is in this manner demulcents prove remedial in all pulmonic irritations.

Unsatisfactory;

But this is no explanation of their obtunding power in remote quarters, as for instance in the kidneys and bladder, where these organs have been stimulated by a blistering plaster: and as Dr. Cullen is not willing to allow of a specific power in medicines of any kind, nothing has remained to him but to cut the Gordian knot abruptly, and to contend that "the operation of demulcents in covering acrimony in the mass of blood, must be very inconsiderable." *

and opposed to
experience.

But this is to uphold an hypothesis by an assertion, opposed to the experienced train of events, and to which he himself submits on other occasions; for Dr. Cullen has no hesitation in recommending the use of demulcents, when we follow him into his practice, almost as freely as any other physician whatever. I pretend not to determine whether they act in every instance when employed internally by their sensible quality of viscosity, or by some insensible specific power; but that, by some means or other, they are capable of allaying irritation in organs remote from the stomach, is a fact so generally known, that it would be a waste of words to bring examples of it. And notwithstanding the difficulty of conceiving how a few drachms of bland oil, or a few ounces of gum arabic, can be intermixed with many pounds of serosity, and still retain their sensible quality of inviscating sedatives, it is by no means more difficult to conceive this, than that moderate doses of sulphuric acid, introduced into the stomach, should pass copiously by the skin in its acid state, as Dr. Cullen allows it to do, and cure the itch; or that the muriate of soda, employed as an ingredient in the manufacture of glass, should, in the melting of this material, impregnate the atmosphere of the glass-house, be inhaled by the lungs of the workmen, and, passing with the matter of perspiration through the pores of the skin, once more concrete in crystals on their foreheads.

Expressed oils
of narcotic
plants.

As several of the vegetable oils are obtained from narcotic plants, it is well worth inquiring, though a different question, whether, in any of these, there is a combination of any portion of the narcotic principle; as such oils would in many cases possess a high advantage over the rest. The oils of this description which have been most tried, are those obtained from the seeds of the *lactuca virosa*, and the *papaver somniferum*: and both these kinds of seeds, while they make pleasant emulsions, are said by many writers to communicate a slight degree of narcotic power at the same time; an

assertion, however, which Dr. Cullen does not give credit to, and which seems to be disproved by repeated trains of experiments in France, and especially by those of the society of agriculture in 1773, with respect to the former. But as I have not tried them sufficiently to speak with decision on the subject, I merely throw out the hint, that it may be followed up by others, and extended to plants not yet examined for this purpose. The seeds of both plants give forth oil pretty freely : those of the poppy often in the proportion of six or seven ounces of the oil to every two pounds of the seeds.

In hot weather, sultry climates, or long voyages, where rancidity may be apprehended, the best, as well as the pleasantest of all the vegetable oils, is the expressed oil of the cocoa nut, commonly known by the name of BUTTER OF CHOCOLATE. It is of a brownish hue when first obtained, but may be whitened by ablution in hot water, and still more so by an alkaline ley, quick-lime, or spirit of wine. It will keep for years without becoming rancid, and may even be left for a month in a copper vessel without undergoing this change.

Of the vegetable mucilages, the best fitted for keeping is that obtained from the Iceland moss. If infused in water before it is boiled, it will lose much of its rough bitterness and colouring material, and its taste will be pleasant. Its viscosity is more than double that of gum arabic ; and emulsions, thus formed, have been kept fourteen weeks without the slightest marks of putrescency.

GEN. I.
SPEC. II.
Bex sicca.
Treatment.

Butter of
chocolate.

Mucilage of
Iceland moss.

SPECIES III.

BEX CONVULSIVA.

HOOPING-COUGH. KIN-COUGH.

THE COUGH CONVULSIVE AND SUFFOCATIVE ; ACCOMPANIED WITH A SHRILL REITERATED HOOP ; AND FREQUENTLY WITH VOMITING ; CONTAGIOUS.

THE Greeks denominated this disease BEX *theriodes* (Ἐπιπρωδης), which the Latins translated literally Tussis *ferina*, "wild or untameable cough," from its violence. The name of Pertussis, by which it has often been called in later times, is of doubtful origin and meaning ; and I have hence followed M. de Sauvages, and exchanged it for Tussis *convulsiva*, the specific epithet being far more expressive than of the Greek writers. Our own name of Hooping-cough is evidently derived from the convulsive clangor which accompanies the fit. The name of *Kin-cough*, by which it is distinguished in the north, and which should rather be written *Kind-cough*, is derived from the Saxon or German term *Kind*, "a child," as being peculiarly common to this age. This cough is contagious, though not in a very high degree ; whence Stoll and other writers have fallen into the error of asserting, that it is not

GEN. I.
SPEC. III.
Greek name.
Latin name
pertussis.

Kin-cough,
meaning of.

GEN. I.

SPEC. III.

Bex convulsiva.

Remote causes
numerous.By Linnéus
supposed to be
produced by
animalcules.Mostly from a
peculiar
miasm.

Description.

so at all.* [Even Laennec † deems the contagious nature of hooping-cough not satisfactorily proved, and regards alternation of temperature quite as much a cause of this, as of other catarrhs.]

The remote cause of hooping-cough it is often difficult to trace. Frequently, indeed, like common or humid cough, it seems to proceed from cold, from some irritability of the stomach ‡, or some peculiar affection of the lungs. § I have already observed, that the dry cough (*tussis sicca*) has occasionally been produced by larvæ of insects, whose minute eggs, being inhaled with the air of respiration, have found a convenient nidus in the bronchial vessels; and hence Linnéus, who at one period of his life endeavoured to resolve almost all diseases whatever into an animalcular or insect origin, taught that the hooping-cough was also produced in the same way by an insect of a peculiar kind. || This opinion has not been adopted beyond the precincts of the Linnéan school. But we are, nevertheless, very considerably in the dark upon the subject; for there are numerous cases of the disease occurring daily, in which it originates from a source that eludes our research altogether. It is most common to children, though sometimes to be met with in adults; is often epidemic; but rarely, if ever, attacks more than once in a man's life. And, from all these circumstances, it may be inferred, that it proceeds, in most instances, from a miasm of a specific nature and peculiar quality; which, like those of the influenza or epidemic catarrh, and the measles, has a direct determination to the lungs; though it is not, like these contagions, essentially linked with fever.

The excretion is at first small in quantity, but afterwards more copious, though always viscid. The hoop, or sonorous spasm, is often accompanied with a rejection of the contents of the stomach ¶; and the whole system during the paroxysm suffers great violence. The face is turgid and purple from suffusion, and the eye-balls swollen and prominent. The little patient, with a forewarning of the attack, falls on his knees at the time, or clings closely to any thing near him. Yet the violence is instantly forgotten; and, after deeply panting for breath, he returns with as much eagerness as ever to his play, or other pursuit: while the vomiting, which is commonly a good sign, is succeeded by a craving for fresh food. [In the words of Laennec, a colourless, and scarcely frothy, but ropy phlegm rather flows, than is rejected from the mouth, after each paroxysm, while the patient leans forward to favour its escape. The paroxysms at first recur several times every day, being almost

* Rat. Med., part ii. p. 184. It is not an uncommon belief, and it was adopted by Cullen, that hooping-cough is not contagious beyond a month, or six weeks from its commencement, just as is the case with some other contagious diseases, as for instance gonorrhœa, though, as Dr. Elliotson well observes, nobody will venture to fix the period of the commencement of its innoxious character. Lect., Med. Gaz., 1832-33, p. 194.

† On the Diseases of the Chest, &c. transl. by Dr. Forbes, ed. 2. p. 96.

‡ Allgem. Deutsche Bibl., lvii. p. 434.

§ Stoll, Prælect., p. 289.

|| Diss. Exanth. viva. Vide Amœn. Acad., vol. v. p. 82.

¶ When the child vomits, it is generally considered a good sign: if there be no vomiting, the case is often found to be very severe. Dr. Gregory knew a lady who never hooped in the disease, but, instead of doing so, always fainted. The disease prevailed in the family, and she had as violent a cough as the rest. Elliotson's Lectures, Med. Gaz. for 1832-3, p. 194.

always most severe towards the evening, but less violent in the night. After a certain time, they return only in the morning and evening, and, towards the end of the disease, in the evening only. Before it terminates, the paroxysms are shorter, lose their peculiar characters, and are attended with an expectoration more decidedly mucous. Sometimes the disease degenerates into a chronic mucous catarrh, with emaciation, and other symptoms resembling those of consumption. In the interval of the paroxysms, the patient coughs but little, and though Drs. Cullen and Watt represent some slight febrile indisposition as being mostly observable at certain periods of the day, Laennec states, that the patient rarely has any fever, except in the case just now mentioned, or at the beginning of a very severe attack.*] The disease lasts irregularly from three weeks to as many months.

[Each fit is composed of a quick succession of sonorous coughs, with scarcely any perceptible intervening inspirations, except that, from time to time, the expirations of coughing are suddenly interrupted by a very deep, seemingly convulsive, and noisy inspiration, accompanied by a lengthened hissing, that constitutes the pathognomonic sign of the disease. Laennec represents the peculiar sonorous inspiration as seated exclusively in the larynx and trachea. He also considered the spasmodic character of the whooping-cough as sufficiently proved by certain phenomena, which occasionally show themselves in the glottis, larynx, and even in the pendulous veil of the palate. The extraordinary noises, made by certain patients in breathing, or coughing, he imputes to a spasmodic or voluntary contraction of these parts. The same, he says, is true of the peculiar sounds which attend the whooping-cough. He has seen patients, who crowed like a cock, or barked like a dog. Dr. Bally sent him a patient with whooping-cough, in whom the paroxysms were accompanied with a cooing, like that of a wood-pigeon. Laennec was convinced by observation, and the aid of the stethoscope, that the sound arose from a spasmodic contraction of the veil of the palate and sides of the glottis. The opinion was further confirmed by the suspension of the sound by an accidental inflammation of

GEN. I.
SPEC. III.
Bex convulsiva.

Seat of the
sonorous in-
spiration.

* See Laennec on Diseases of the Chest, &c. transl. by Forbes, p. 96. ed. 2. 8vo. Lond. 1827. As bronchitis is not an infrequent complication of whooping-cough, especially of the most dangerous forms of it, febrile symptoms must occasionally attend the disorder. Dr. C. Johnson distinguishes four states of whooping-cough: 1. Simple whooping-cough. 2. Whooping-cough complicated with bronchitis, or peripneumony. 3. Complicated with disordered bowels, or infantile remittent fever. 4. With convulsions, or hydrocephalus. The latter ought, perhaps, to have made two varieties. We see then that the disease is liable to be combined with infantile remittent fever, as well as the common sympathetic fever of inflammation. A great number of the long protracted cases are complicated with remittent fever, which sometimes begins with a rigor, but more frequently comes on so gradually, that the date of its commencement cannot be fixed. "The paroxysms of coughing become more frequent, and the breathing is quickened and oppressed; but still it may be, with a little care, distinguished from the attack of bronchial inflammation. The stethoscope affords us useful though negative evidence. The usual symptoms of bronchial inflammation are absent. The frequency and force of the respiration are increased; but this increase is not accompanied by any râle, indicative of bronchial inflammation; while the daily remissions, the loaded tongue, the nature of the alvine discharges, the aspect of the child, constantly picking his nose and lips, all serve to determine the true character of the disease." Cyclop. of Pract. Med., art. Whooping-cough, by Dr. C. Johnson. — ED.

GEN. I.

SPEC. III.

Bex convulsiva.

Symptoms mitigated by a free discharge of mucus.

Seat placed by Butter in the alimentary canal.

Why dangerous in infants.

Prognosis.

In adults.

Identified by Marcus with croup.

the throat, and its renewal, in a less degree, on the subsidence of the latter complaint.*]

The whooping-cough, when in the height of its career, is usually accompanied with a very copious secretion of mucus, a free discharge of which mitigates the general symptoms. From this circumstance Dr. Butter concludes, that a morbid irritability of the mucous glands is the primary affection, to which the spasms are only secondary.† It is somewhat singular, that, with this view of the disease, he should place its seat, not in the larynx, or any part of the trachea, but in the alimentary canal. In infants, it is mostly alarming from its tendency to produce convulsions, suffocation, apoplexy, inflammation of the brain, ruptures, and incurvation of the spine. [The younger the subject, the more dangerous the disorder generally; and the large majority of those who die from its attacks, are observed to be under two years of age. Children, born of phthisical asthmatic patients, are most liable to suffer from the violence of the disease. Yet it is said, that a healthy child under six months, who has a good nurse, will get through the disease better than one a few months older, who has been recently weaned, or in whom dentition has commenced. The following circumstances are also enumerated by Dr. C. Johnson, as justifying a favourable prognosis: dentition being completed, and the head, bowels, and lungs not being subject to determinations or irritations; the season of the year being mild and dry; the patient not suffering, or not having recently suffered from any of the other diseases of childhood, and having a sound healthy constitution; finally, the accessions being at long intervals, the remissions complete, and the night, during which the symptoms are usually most severe, well spent. In adults, the prognosis is more favourable than in infants.‡] In adults, it excites pneumonitis more frequently than in children; and, in pregnant women, has often led to abortion. A moist skin, warm extremities, open bowels, plentiful expectoration, and free vomiting, are favourable symptoms. Frequent hemorrhage protracts the disease; and if it proceed from the lungs, a foundation will often be laid for phthisis. The violence of the action occasionally excites inflammation in the trachea. Dr. Marcus, among other singular opinions that distinguished his career, brought himself at last to believe, that such inflammation was always present: and having advanced thus far, he next undertook to show, that whooping-cough and croup are one and the same disease. He died, indeed, while dictating the preface to his treatise on the former affection, which he hoped would establish this opinion. Dr. Dawson has since revived a part of this hypothesis, by conceiving that whooping-cough is a specific inflammation, seated in the glottis, or upper part of the trachea, and spreading more or less widely, according to the degree of its violence: but he does not identify it with croup.§

[Dr. Watt inculcated the opinion, that whooping-cough is essentially an inflammation of the mucous membrane of the bronchiæ, which statement agrees with Laennec's description; and, if correct,

* Op. cit., ed. 2. p. 96—98.

† Treatise on the Kin-cough, with an Appendix, &c. 8vo.

‡ Cyclop. of Pract. Med., art. HOOPING-COUGH.

§ Nosological Practice of Physic, 8vo. 1824.

the complaint should properly be regarded, with Laennec, as a species of catarrh, and classed accordingly. The disease, when fatal, generally becomes so from severe bronchitis. In several instances, in which the state of the lungs was ascertained by dissection after death, the most remarkable appearances were an inflamed condition of the trachea and bronchiæ, particularly of the latter, and an almost complete obstruction of the bronchial passages with a serous or mucous fluid, interspersed with flakes of semipurulent matter.* These effects may be supposed to be only the consequence of the violent cough; but, as Dr. Forbes has remarked, the opinion, delivered on the seat of the complaint by Dr. Watt, is amply confirmed by the early symptoms, and the indications of the stethoscope.†]

In a few rare instances, whooping-cough assumes a periodic character, and is then sure to become peculiarly intractable. Dr. Perceval, in his *Comments on the Nosology*, has favoured me with a singular case of this kind, which occurred daily at a certain hour, attended with a tremor of the whole body: the fit terminating by a shriek, rather than a hoop. The complaint was obstinate for several months, and returned at the same season for two years. It yielded to no medicine, and was supposed to depend on some morbid condition of the liver.

[Notwithstanding the contrary statements sometimes made, Dr. C. Johnson believes, that the whooping-cough rarely, if ever, affects the same individual twice; and that it is seldom met with in adults ‡, of which, however, instances are upon record.]

Dr. Cullen, in laying down his own mode of treatment, indulges in an ingenious, and I believe correct, hypothesis, and divides the disease into two stages. The first consists of that part of it, during which he supposes the contagion to be present and operative, which possibly may include the first three weeks; the second embraces the remainder of its duration. Throughout the former stage, our attention should be directed to whatever will moderate the influence of the contagious stimulus, retard the return of the convulsive paroxysms, and mitigate their violence. [If the patient can be made to drink by small and repeated portions during the paroxysm, its severity and duration, according to Laennec §, will be diminished; perhaps from the effort of deglutition facilitating deeper inspirations, by counteracting the spasm of the bronchiæ.] Bleeding, in severe cases, will usually be found necessary for this purpose; but, it should be avoided, under other circumstances;

GEN. I.
SPEC. III.
Bex convulsiva.

Periodic whooping cough.

Rarely occurs twice in the same individual.

Medical treatment. Attention to it under two stages, as recommended by Cullen.

Process under the first stage.

Bleeding how far proper.

* *Treatise on Chincough*, &c. p. 123. 8vo. 1813.

† Note in transl. of Laennec on *Diseases of the Chest*, &c. p. 98. ed. 2. In the greater number of cases where children die, says Dr. Elliottson, there is a violent bronchitis, sometimes combined with an extensive inflammation of the substance of the lungs. But, he adds, that, on opening children, who have died of this disease, you sometimes find very little the matter with the lungs, and death may have arisen from some other cause; for the disease has a great tendency to produce hydrocephalus and convulsions. When the air-cells inflame, and the lungs become more or less hepatized, the silvery rattle may be heard with the stethoscope, and the breathing is excessively loud and rough throughout the chest. (Lect. at Lond. Univ. See *Med. Gaz.* for 1832-3, p. 194.) The danger is in proportion to the affection of the head, the bronchitis, and the peripneumonia. — ED.

‡ *Cyclop. of Pract. Med.*, art. *HOOPING COUGH*.

§ *Op. cit.*, p. 98.

GEN. I.
SPEC. III.
Bex convulsiva.
Emetics why
useful.

and it will generally be found better to employ blisters as a substitute. The most effectual remedy is emetics; whose action tends equally to interrupt the return of the paroxysms, and to keep the lungs unloaded, by producing a determination towards the surface. [Laennec recommends them to be repeated every day, or every second day, for a week or a fortnight; and prefers tartarized antimony to ipecacuan, on account of the great inequality of power in the latter, and the solubility of the former allowing it to be more easily administered in doses proportioned to the exigency of the case.*] The food must be light, and costiveness carefully prevented; but no benefit seems to be derived from purging. †

From purging
no benefit.

In this manner, upon Dr. Cullen's mode of treatment, we are to guide the patient through that part of the disease, which we may suppose to be kept up by the stimulus of contagion. In its latter part, or second stage, in which a morbid habit alone is, in all probability, the irritative power, a different course is demanded. For we have now nothing more to do, than to oppose the spasmodic habit by an antispasmodic process; and hence different tribes of medicines have been resorted to, which may be arranged under the three divisions — of SEDATIVES, for the purpose of taking off the morbid irritability of the affected muscles; STIMULANTS, for the purpose of local or general revulsion; and TONICS, for that of both local and general re-invigoration.

Process under
the second
stage.

The sedatives, chiefly recommended, have been opium, hyoscyamus, belladonna, conium, musk, and the hydrocyanic acid.

Sedatives.

Though opium has the authority of many distinguished practitioners ‡, it has often been found of no avail, even where it has been given in large and frequent doses; and, still more generally, it has been productive of greater mischief than good. The compound powder of ipecacuanha is one of the best preparations of opium which can be employed in this disorder. The conium has acquired a far higher degree of public favour, for which it is much indebted to the writings of Dr. Butter, who represents it as having the double virtue of retarding the returns of the convulsive paroxysms, and of mitigating their violence; and, on this account, he pre-

Opium and
conium.

* Laennec on Diseases of the Chest, &c. p. 99. ed. 2. transl. by Forbes.

† A better founded division of whooping-cough is into the inflammatory and merely spasmodic forms. If there should be a constant oppression of the breathing, with spasmodic attacks, and a violent cough at times, an accelerated pulse, and a sonorous, sibilous, and crepitous rattle, there is inflammation of the bronchiæ, or the substance of the lungs. Here, as Dr. Elliotson properly remarks, you might give all the antispasmodics, all the narcotics, and all the medicines that are supposed to have a direct influence over spasm, and yet do no good. If the patient be old enough, he must be bled occasionally in the arm; leeches should be applied to the chest, and mercury and emetics exhibited. "In the greater number of cases, the inflammation is such as will yield to the application of a few leeches and the exhibition of emetics; but it is of great use likewise to clear out the bowels by calomel, provided the inflammation is severe, and to give it steadily in small and repeated doses." (Med. Gaz., loc. cit.) Dr. Elliotson is also an advocate for the warm bath, and for not letting children with this disease overload the stomach, or move or run about a great deal; circumstances always aggravating the cough, and the bronchitis, if any degree of it be present. — ED.

‡ Hufeland, N. Annalen, i. p. 367. Demachy, Manuel de Pharmacie. Paris, 1788. — Rüling, Beobachtung der Stat. Northcim., p. 107.

scribed it through every stage of the disease, and however complicated with other affections. He employed it, moreover, in every form, whether of powder, extract, plaster, or cataplasm; but, for internal use, he gave the powder, allotting a grain a day to infants under six months, and ten grains to adults, with a gradual increase as they persevered. [After emetics, Laennec also prescribes narcotics in small doses, and considers the extract and powder of belladonna as the best medicine of this class. The dose is from $\frac{1}{8}$ to $\frac{1}{2}$ of a grain. Its efficacy in lessening the severity of the cough, and shortening the duration of the disease, he conceives, may be accounted for by its lessening the necessity of respiration, and consequently the dyspnoea; obviating the spasm of the bronchiæ; diminishing the irritation produced by the vascular congestion of the mucous membrane; and lessening the augmented secretion.*]

Musk has been tried both abroad and at home, from six grains to half a drachm at a time; but its effects are so various, and, indeed, contradictory in different individuals, as to prevent confidence in its use.

The prussic or hydro-cyanic acid has unquestionably subdued the spasmodic irritation, and consequently relieved the cough, in a variety of instances. It is here indeed, and in nervous cough, that it seems to act with most advantage.† I have known it succeed when there was the utmost degree of danger from general convulsions; the dose for a child of four years old being from a drop to a drop and a half, or even two drops of Scheele's preparation of the acid, every four hours, till a decided impression is produced.‡

The stimulant plan, if it have not been more successful than the sedative, has at least been as powerfully supported. Its intention I have already stated to be that of taking off the propensity to spasmodic action in the trachea, by exciting a general or remote local revulsion. And the medicines, chiefly employed for this purpose, have been cantharides, ammonia, ether, camphor, the herb Paris, and rhus Vernix.

[Laennec has seldom found blisters of much use §: instead of them, Autenrieth has proposed the application of tartar emetic ointment to the chest, a plan, from which more benefit has sometimes resulted than from blisters.]

When blisters were formerly employed with great freedom in the hooping-cough, it was thought to be ascertained, that they always answered best when they irritated the bladder and occasioned strangury. And, on this account, some practitioners have endeavoured to produce the latter effect without the pain of the former, and have for this purpose employed cantharides in tincture, in the proportion of twenty minims to a dose. || Dr. Barton of York first joined it with bark and the compound tincture of camphor, a practice afterwards adopted by Dr. Lettsom, Hufeland,

GEN. I.
SPEC. III.
Bex convulsiva.

Belladonna.

Musk and artificial musk.

Prussic acid.

Stimulants.

Cantharides.

Blisters and antimonial ointment.

* Laennec, op. cit., p. 99.

† Recherches Physiologiques et Cliniques sur l'Emploi de l'Acide Prussique, &c. par N. Magendie, D.M. Paris, 1819.

‡ If the child be young, Dr. Elliotson recommends one minim to be put in an ounce or two of almond emulsion, one teaspoonful of which, he says, will be the proper dose, three or four times a day. — Ed.

§ On Diseases of the Chest, &c. p. 99. ed. 2.

|| Ferbes, loc. cit.

GEN. I.
SPEC. III.
Bex convulsiva.
Stimulant embrocations.

and others. But whether given alone or in combination, I have never found any decided benefit from its use.

Where the intention is to divert the tendency to convulsive action by local revellents, it is far better to employ them externally, and particularly on the chest, and down the chain of the spine. The most common stimulants for this purpose are camphor, ammonia, ether, and the essential oils of amber and turpentine, which, in different combinations, have been long used, and still preserve their reputation.

Whence beneficial.

I have reason to believe, that embrocations of this kind have often proved highly beneficial: and it is not difficult to account for such an effect: since the cervical and dorsal nerves are so generally distributed over the muscles of the chest, the diaphragm, and the scapulæ; and some of them, as the accessory nerves of Willis, form an integral part of the par vagum, and assist in giving rise to the cardiac and pulmonic plexus.*

Universal revellents.

Many stimulants have also been occasionally employed internally for the purpose of producing an excitement generally, and thus of acting as universal revellents; as camphor, ammonia, and the sulphuric and nitric ethers. These have often been found useful, and, where narcotics are given, they rather assist, than oppose their good effect.

Lobelia inflata.

[Dr. Andrews † prescribed the tincture of lobelia inflata with striking success. He says, that there is no other medicine that so effectually frees the bronchial vessels of their viscid secretion. It is emetic and antispasmodic. The dose generally given by him, was thirty or forty minims, every twenty minutes.]

Rhus vernix.

The *rhus vernix* comes also strongly recommended by many foreign writers of distinguished character, as a stimulant and antispasmodic of considerable power, and highly useful in the whooping-cough. Dr. Fresnoi, to whom we are chiefly indebted for our acquaintance with it, employed its leaves in the form of an extract. Of this he dissolved four grains in four ounces of syrup, and gave a table-spoonful every three hours to a child.

Assafoetida.

[By Dr. Millar, a high opinion was entertained of assafoetida, as a remedy for whooping-cough, as well as asthma.]

Tonic medicines and regimen.
Cinchona.

After all, if no bronchitis exists, perhaps the best antispasmodics are tonic medicines, and a tonic regimen. Dr. Cullen trusts almost exclusively to the cinchona: "I consider," says he, "the use of this medicine as the most certain means of curing the disease in its second stage; and when there has been little fever present, and a sufficient quantity of the bark has been given, it has seldom failed of soon putting an end to the disease."

The best and most convenient form of the bark for children is the sulphate of quinine. [It is observed by Laennec ‡, that, when the paroxysms of whooping-cough assume a periodical type, cinchona, and the sulphate of quinine, are as efficacious as in cases of ague.] When the sulphate of quinine disagrees, as it will sometimes do, I

* The inhalation of tar fumes, sometimes recommended, is only allowable when no inflammation is present. See Elliotson, Med. Gaz., 1832-3, p. 196. — Ed.

† See Glasgow Med. Journ., vol. i. p. 178.

‡ On Diseases of the Chest, &c. p. 99. ed. 2.

Mineral tonics,
Oxyde of zinc.
Nitrate of
silver.

have employed the mineral tonics, as the oxyde of zinc, from half a grain to a grain, two or three times a-day ; or the nitrate of silver, from the twelfth to the eight part of a grain, repeated in the same manner.

[Dr. Elliotson considers the preparations of iron as the best tonics which can be employed in cases of whooping-cough, where no occasion for antiphlogistic treatment exists. The sulphate can be conveniently given to children in mixtures, or the carbonate blended with treacle.]

As an important part of our tonic plan, may be mentioned change of air, and especially where the difference of temperament, or even temperature, can be rendered very considerable, as from a low to a high atmosphere, or from the interior of a country to the sea-coast ; but cold-bathing, so far as my own experience extends, has proved more certainly and rapidly remedial, than any other prescription whatever ; and particularly where it has never been made use of before, and hence introduces a new action into the system.

[The extract of common daffodil (*narcissus pseudo-narcissus*), and the infusion of its petals, were proposed, a few years ago, as a specific against this disease. Laennec *, who tried the extract, found it, however, much less efficacious than belladonna. The dose is half a grain, or a grain, or two grains, every two, four, or six hours, according to the patient's strength. Its mode of action is imperfectly known. †]

GEN. I.
SPEC. III.
Bex convulsiva.

Sulphate or
carbonate of
iron.

Change of air.

Cold bathing.

Narcissus
pseudo-nar-
cissus.

GENUS II.

LARYNGISMUS.

LARYNGIC SUFFOCATION.

SENSE OF SPASMODIC SUFFOCATION IN THE LARYNX, COMMENCING SUDDENLY, AND RELAXING, OR INTERMITTING ; COUGH TROUBLESOME ; SCANTY DISCHARGE OF VISCID MUCUS.

THERE is a disease that often attacks the larynx, and especially of infants and children, which has so near a resemblance to croup, as to be very generally confounded with it, and which is hence commonly known by the name of *spasmodic croup* : but which, notwithstanding the resemblance of many of its symptoms, is essentially different from it, and ought to be arranged in a different place. It is for this purpose the present genus has been formed, and the present name invented, with a termination that sufficiently distin-

GEN. II.
Often con-
founded with
croup, and
called spasmo-
dic croup.

* On Diseases of the Chest, &c. p. 99. ed. 2. transl. by Forbes.

† When whooping-cough is complicated with infantile remittent fever, depending on constipation, or on derangement of the abdominal secretions, purgatives and alteratives are called for ; especially, in the former case, calomel, rhubarb, and scammony ; and, in the latter, rhubarb and carbonate of soda, or the hydrag. cum cretâ, or Dover's powder, followed by castor oil. — ED.

GEN. II.
Laryngismus.

Distinction between the two.

guishes it from laryngitis, or *inflammation* of the larynx, yet a termination that has the sanction of the best medical writers in every age.* The distinctive characters of bronchlemitis or croup are, inflammation of the mucous membrane of the trachea and bronchial vessels, and the secretion of a peculiar concrete and membrane-like material that lines the tracheal tubes, and threatens suffocation by obstructing them. In the disease before us, we have neither inflammation nor membrane-like secretion; while the sense of suffocation is produced, not by obstruction, but by spasm. The only known species belonging to this genus is the following.

SPECIES.

LARYNGISMUS STRIDULUS.

STRIDULOUS CONSTRICTION OF THE LARYNX.

COMMENCING USUALLY IN THE NIGHT; VOICE SHRILL AND CROAKING; COUNTENANCE FLUSHED AND SWOLLEN; DISTRESSING STRUGGLE FOR BREATH.

GEN. II.
SPEC.

Sometimes confounded with asthma;

THIS species forms the spasmodic asthma of Millar, Parr, and various other writers. Yet it is not strictly an asthma, though it makes an approach to it; and the name, under which it has been thus described, shows sufficiently, that the present is the proper place for its reception. In asthma, the constriction begins in the chest, and chiefly exerts itself there, though the spasm may extend to the upper part of the trachea. In spasmodic laryngismus the constriction commences in the larynx, and is chiefly confined to that organ, though it may extend to the chest. In the former, the respiration is wheezy, but the voice is not stridulous; in the latter, the voice is stridulous, but the respiration is rarely wheezy, or seldom so in an equal degree; evidently showing a difference in the seat of the two diseases. And hence I have found it necessary to separate it from asthma, and arrange it under a different head.

yet more nearly resembles croup.

As already observed, the general symptoms make a nearer approach to croup. "The inconvenience," observes Dr. Parr, "is the greater, since, from the resemblance of the symptoms, remedies have been celebrated as successful in croup which were never used in the disease; and the less experienced practitioner, trusting to them, has felt the severest disappointment."

Diagnostics: containing other marks of distinction between the present species and croup.

The suddenness with which this complaint commences its attack, forms another mark of distinction between itself and croup, almost as pathognomonic as the absence of inflammation, and the peculiar secretion in the latter. There are instances, indeed, in which genuine croup has also commenced abruptly, but these are very rare; for it has usually the precursive symptoms of a slight

* See Prelim. Diss. to the Author's System of Nosology.

cough and hoarseness for a day, and sometimes two days, as though the patient were labouring under a catarrh. In croup, also, the inflammation, when it has once taken effect, becomes a permanent cause of excitement, and the anxiety and struggle for breath continue, with little if any abatement, till the inflammation is subdued. In the disease before us, the spasm suddenly subsides in a short time, though it may perhaps return in an hour, or half an hour, or even a few minutes; and, in the interval, the patient enjoys perfect ease, though the voice is rendered hoarse from the previous straining. Croup is, moreover, an exclusive disease of children; stridulous spasm of the larynx is sometimes found in adults. Those who have been dissatisfied with the name of spasmodic asthma, have, however, treated of it under the name of spasmodic croup, but merely because they have not known how else to distinguish it; for almost every one, who has thus noticed it, has acknowledged, that it is a different disease, and demands a different plan of cure.

The exciting causes are not always clear: cold and teething are the most common. It appears most frequently in relaxed and irritable habits, where, in truth, we should soonest expect a display of spasmodic action. As there is mostly some degree of cough, and always a secretion of a small portion of viscid mucus, and a croaking voice, there is indeed great reason for supposing some degree of local irritation; and it is on this account that I have preferred entering the disease here, to an arrangement of it under the fourth class, consisting of diseases that are purely and idiopathically nervous. It is possible, however, that some of these symptoms may be the result of the spasmodic struggle itself.

An active plan of treatment is imperiously demanded. Yet an antimonial emetic generally effects a cure as soon as it begins to operate, if employed early: but the diaphoresis which it excites should be maintained for some hours, by keeping the child in bed, and the use of diluents; which will be the most effectual means of preventing a return of the spasm. The bowels should also be excited by a purgative of calomel. And if the emetic do not prove sufficient, or the stricture should be renewed, laudanum should be exhibited according to the age of the patient, and a blister be applied to the throat. But bleeding, which is indispensable in croup, should here be avoided, as it will only add to the irritability. Those who regard this affection as an asthma, have strongly recommended the fetid antispasmodics, as assafœtida, both by the mouth and injections; but I have not found them successful.

Generally speaking, after the action of the emetic, the child falls into a deep and quiet sleep, and awakes with few remains of the complaint. Yet, if the spasm be not attacked at once, suffocation may soon follow. Those, who have once laboured under it, are more susceptible of it than before; and the younger branches of some families seem much more predisposed to it than those of others.

This disease has been noticed by M. Bretonneau of Tours, and described under the name of *angina stridula*. It was mistaken occasionally for a peculiar form of *angina maligna*, which was then prevailing as a contagious disease, and in which the local inflammation, instead of producing ulcerations, threw off membranous or croupy exfoliations, and was accompanied with a croupy suffocation. But,

GEN. II.
SPEC.
Laryngismus
stridulus.

Exciting cause
not obvious.

Treatment.

GEN. II.
SPEC.
Laryngismus
stridulus.

in the case before us, there was no swelling of the lymphatic glands at the angle of the jaws; the tonsils and velum palati were free from redness or tumefaction, and no pain was complained of in the region of the larynx. While the attendants were about to apply leeches, and exhibit an emetic, the little patient fell into a refreshing sleep; a gentle moisture appeared on the skin, the cough became looser and little troublesome; and next morning the complaint was nothing more than a common cold, which required no further medical aid. M. Bretonneau regards this affection as only a simple œdematous tumefaction (*une simple tuméfaction œdémateuse*) of the mucous folds in the ventricles of the larynx.*

GENUS III.

DYSPNŒA.†

ANHELATION.

PERMANENT DIFFICULTY OF BREATHING; WITH A SENSE OF WEIGHT IN THE CHEST.

GEN. III.
Difficulty in
settling the
present genus.

THERE has been no small perplexity felt by nosologists in arranging the various diseases, which are chiefly characterised by irksome or distressful breathing. The lungs, like the stomach, maintain a

* *Des Inflammations spéciales du Tissu Muqueux, &c.* Par P. Bretonneau, Médecin en chef de l'Hôpital de Tours, 8vo. Paris, 1826.

† Dyspnœa is generally only a symptom of disease. It is correctly observed by Dr. Williams, that as the elements, or principal parts, concerned in the function of respiration are three, namely, the blood, the respiratory machine, and the air, the causes of dyspnœa may arise from changes in any of these. Hence, in the consideration of this subject, he divides it, 1st, into derangements which interfere with the respiratory movements; 2dly, derangements which obstruct the passage of air to and from the pulmonary cells; 3dly, derangements in the pulmonary tissue, obstructing the action of the air on the blood. Dr. Williams conceives, that the muscular act of inspiration is excited by a sensation, arising from the presence of black blood in the lungs. The views, adopted in the following passage, should never be forgotten in the investigation of dyspnœa and asthma. "As the peculiar condition of the blood, which is called venous, is the immediate cause of the sensation of dyspnœa, so the blood being, (if we may use the expression,) *more venous* than usual, may give rise to the feeling of dyspnœa, without any derangement of the respiratory apparatus. Of this nature is the dyspnœa arising from violent exercise, which ceases as soon as the flow of venous blood to the lungs becomes moderated by rest. Whether other processes, such as increased secretions, the digestion of blood, &c. be capable of producing the like effect, that is, of so changing the blood, that, although the respiration be healthy, this fluid is arterialized with sufficient rapidity to prevent the feeling of dyspnœa, is uncertain; but the stethoscope teaches us, that the function of respiration is more active in some individuals than in others, and that there is also a difference in the same individual at different times." Dr. Williams then adverts to individuals, whose lungs are defective from disease, and who experience dyspnœa after taking food, though not usually sufferers from this complaint at other times. "It is," says he, "through the blood, rather than in any other way, that diseases of the heart sometimes give rise to dyspnœa; any impediment to the pulmonary circulation causing imperfection in the oxygenating process." *Cyclop. of Pract. Med.*, art. DYSPNŒA. — ED.

close connexion with most of the functions of the body, and the organs which are instrumental to them; while the complaints affecting respiration, that originate in the chest, run so frequently into each other, as to require the utmost nicety in drawing the line between what ought to be regarded as genera and what as species. There are three thoracic disorders that are peculiarly obnoxious to this remark; I mean those, which among recent writers have been described under the names of dyspnœa, orthopnœa, and asthma. Celsus, following the Greek physicians, regards them as only modifications of the same malady, merely differing from each other in degree.

GEN. III.
Dyspnœa.

How regarded
by Celsus.

"Each," says he, "consists in difficulty of breathing. When this difficulty is moderate and unsuffocative, it is called dyspnœa; when it is more vehement, so that the breathing is sonorous and wheezing, it constitutes asthma; and when it can only take place in an erect position, it is denominated orthopnœa. The first is usually a chronic affection, the latter two acute."* Galen, on the contrary, treats of these diseases as distinct genera, and discusses them in remote positions.

How by Galen.

The same diversity of view has occurred in modern times. Sir John Floyer and Dr. Bree have reduced the three divisions of Celsus to two, and have used the term *ASTHMA* as a generic name under which to arrange them. These two divisions are *CONTINUED ASTHMA* and *CONVULSIVE OR PERIODIC ASTHMA*†; the former being the *DYSPNŒA* of the Greek writers and of Celsus, and the latter uniting their *ASTHMA* and *ORTHOPNŒA*. I call these divisions, rather than species, because Dr. Bree makes four subdivisions of the latter, derived from their supposed causes, and assigns the name of species to them when thus subdivided: though, if asthma be employed generically, it would perhaps be more consistent with the rules of classification to name the primary ramifications species; and the secondary, sub-species or varieties.

A like diversity
of view in
modern times.

Arrangement
of Floyer and
Bree.

Almost all the continental writers make each affection a separate genus, as does Macbride among those of our own country. Cullen makes a genus of dyspnœa, as well as of asthma, but merges orthopnœa in the former; Dr. Parr and Dr. Young take as little notice of orthopnœa, and, with Celsus, reduce dyspnœa and asthma to the rank of species, under a genus, which they denominate *anhelatio* or *pneusis*, which are a Latin and a Greek synonym; the former of which is applied by Sauvages to an entire order.

Continental
writers.
Cullen.
Parr and
Young.

Yet Dr. Cullen himself, in his *First Lines*, is untrue to his Nosology; for having in his earlier work arranged and defined dyspnœa as a distinct genus, in his later he expresses doubts whether, under almost every modification, it is to be regarded otherwise, than as a vicarious or symptomatic affection. On which account, probably, Dr. Crichton, though for the most part very scrupulous in adopting Dr. Cullen's views, has banished dyspnœa as well as orthopnœa from his catalogue, and has only retained asthma of the whole three. Dr. Wilson Philip seems to make little distinction in the use of the terms asthma and dyspnœa, for his habitual asthma

Cullen untrue
to himself.

Crichton.

* *Medicinæ*, lib. iv. iv. 2.

† *Inquiry into Disordered Respiration*, 5th edit. p. 231.

GEN. III.
Dyspnœa.The difficulty
how resolvable.

and asthmatic dyspnœa are synonymous for the same disease, and run parallel with the present genus.*

There is, nevertheless, a distinctive character, which, if steadily adhered to, may easily settle the question, and designate the proper place to which each respectively belongs. The difficulty of breathing is sometimes permanent; and sometimes recurrent, with considerable intervals of perfect ease; and, where it is permanent, it is occasionally distinguished by sudden and irregular exacerbations. These characters are clear, and cannot well be mistaken; and it is upon these pathognomonic marks that the arrangement we are now about to pursue has been founded. Dyspnœa distinguishes the cases of permanent difficulty of breathing; asthma, those of the recurrent; and orthopnœa, the cases of permanent difficulty of breathing with irregular exacerbations. The first two, therefore, form distinct genera; the last is necessarily a peculiar species of dyspnœa, linking it very closely with asthma.

Thus bounded and distinguished, dyspnœa, as a genus, offers us the two following species:

1. DYSPNŒA CHRONICA.

SHORT BREATH.

2. ————— EXACERBANS.

EXACERBATING ANHELATION.

SPECIES I.

DYSPNŒA CHRONICA.

SHORT BREATH.

THE BREATHING UNIFORMLY SHORT AND HEAVY; MOSTLY
ACCOMPANIED WITH A COUGH.

GEN. III.
SPEC. I.

THE causes of this complaint exist in the chest locally, or in the habit or constitution generally: they are inbred, or the result of accident; and hence the disease exhibits the following varieties:

α Organica.
Organic dyspnœa.

From organic deformity, oppression,
or accidental injury.

β Extranea.
Extraneous dyspnœa.

From calcareous or other spicular
materials, inhaled while working
on stones or metals.

γ Vaporosa.
Mephitic dyspnœa.

From the mischievous action of
metallic or other poisonous ex-
halations.

δ Phlegmatica.
Phlegmatic dyspnœa.

From a phlegmatic or cachectic
habit.

ε Pinguedinosa.
Corpulent dyspnœa.
Pursiness.

Accompanied with oppressive fat-
ness.

* On Indigestion, &c. p. 377. 384. 4th edit. 8vo. Lond. 1824.

When the chest labours under an ORGANIC DEFORMITY, or oppression, or the effects of an accidental injury, its cavity is contracted, and its motive powers are usually enfeebled, or curtailed in their action. This is by far the most frequent variety, under which the disease makes its appearance. In some instances, the lungs have been found peculiarly small*, and shrivelled†, in persons who have died of this complaint. [Laennec says, that they diminish in size only from the effects of external pressure, or in consequence of the growth of accidental productions within their substance, which may be considered as exerting a pressure from within outwards. This opinion he illustrates by a reference to what happens in cases of empyema and tubercles.‡] The lungs are sometimes peculiarly hard, and cartilaginous in the duplicature of the pleura which surrounds them.§ There has been adhesion between the folds of their membrane; or adhesion, sometimes ossification||, between the pleura and the ribs, sufficient to lay a foundation for difficulty of breathing. The lungs have been found loaded with hydatids, which have diminished their elasticity¶; and sometimes these animalcules have been thrown up by coughing**; and still more frequently the lungs have been indurated by scirrhous, or oppressed with steatomatous, or other tumours.

In Bonet and other writers, we have also examples of internal oppression, and a diminution of cavity, produced by an excessive magnitude in the substance of the lungs, offering a sort of parabysma of this organ, so as to leave little room, and allow little elasticity for their proper play.†† And still more generally the oppressive cause lies without, and the capacity of the chest is diminished by rickets, or a softness of the bones (*parostia flexilis*), or some accidental injury, by which the ribs or sternum have lost their proper form, and are become incurvated, and without a power of elevation.

In all these cases, the healing art can do little. It may, perhaps, occasionally palliate some of the distress to which the patient is irrevocably doomed, but it cannot go further. Perfect tranquillity of body and mind, gentle exercise, a light diet, with a total abstinence from flatulent vegetables and fermented liquors, and an undeviating habit of regular hours, comprise, perhaps, the whole that can be recommended by the physician, or attempted by the patient. [Where dyspnœa depends on the presence of hydatids, or, as Laennec terms them, acephalocysts in the lungs, common salt appears most deserving of trial as a means of cure. Sheep which feed in salt meadows are exempt from the rot and staggers, which are occasioned by the developement of two species of vesicular worms in the abdominal viscera and brain. If attacked, a removal to such

GEN. III.

SPEC. I.

α D. chronica organica.

Causes from rigidity of structure.

Hydatids.

Excessive magnitude in the lungs.

Causes operating from without.

Treatment and regimen.

* Sandifort, Observat. Anat. Pathol.

† Bonet. Sepulch., lib. x. sect. i. obs. 45.

‡ On Diseases of the Chest, p. 147. 2d edit.

§ Schreiber, Nov. Comment. Petropol., III. p. 395.

|| Schachier, Diss. de Ossificatione Præternaturali, Lips. 1726.

¶ Bonet. Sepulch., lib. II. sect. i. obs. 33. Also, valuable observations on this subject, by Laennec, p. 373. 2d edit.

** Ephem. Nat. Cur., Dec. II. ann. i. obs. 80.

†† Sepulchr., lib. II. sect. i. obs. 57, 58. Ruysch; obs. 19. 21. Eph. Nat. Cur., Dec. I. ann. i. obs. 6. Id., Dec. II. ann. x. obs. 175.; and Laennec on Diseases of the Chest, chap. on Hypertrophy of the Lungs, p. 146. 2d edit.

GEN. III.

SPEC. I.

a D. chronica organica.

β D. chronica extranea.

Nearly related to *β* Tussis sicca.

Magnetic device.

meadows generally cures them. Salt-water baths have appeared to Laennec to benefit patients afflicted with analogous complaints. It is not necessary, he says, that the hydatids should be expelled, to effect a cure: it suffices if they be deprived of their vitality, after which their liquid is absorbed, the cyst shrinks into a small compass, and, upon cutting into the tumours, we find the hydatids quite flattened, and sometimes stratified with layers of albuminous and friable matter.*]

Sawyers and hewers of freestone or other fossil masses; glass-cutters, china-manufacturers†, lapidaries, and workers upon metals, are often subject to dyspnœa, from having the LUNGS LOADED WITH FINE PULVERULENT PARTICLES, detached from the materials on which they are employed, and floating in the atmosphere that surrounds them. And to these may be added, millers, starch-makers, horn and pearl-workers, needle, edge-tool, and gun-barrel grinders; and, for a like reason, weavers, wool-carders, and feather-dressers. This affection is so nearly similar to the variety *β* of *dry cough*, on which we have treated already, that it is only necessary to refer the reader to the remarks there laid down. The cause and mode of treatment are the same; and the symptoms chiefly differ from a difference of constitution. Where the lungs are peculiarly irritable, a troublesome cough will ensue from the first, before any considerable quantity of buoyant particles can have entered into the bronchiæ; but, where there is little irritability, no cough demanding particular attention has shown itself for years; and the lungs, from a habit of exposure to the same influence, have betrayed no uneasiness, till they have gradually been transformed into almost a mine or quarry of the material worked upon.‡ Various contrivances have been devised for straining off the floating particles from the air inhaled, and thus producing a preventive. Dr. Johnstone, long ago, proposed a muzzle of damp crape for this purpose; Dr. Gosse, a sponge; and M. D'Arcet an apparatus which he calls a fourneau d'appel: but, for workers in steel or iron, one of the most ingenious is a peculiar kind of magnet, that concentrates the metallic spiculæ, and thus prevents them from floating loose in the inspired air. It is an invention of Mr. Abrahams, of Sheffield, and has justly met with the approbation of the Society for the Encouragement of Arts.

[The doctrine of diseases of the lungs being produced by the inhalation of dust, and other extraneous particles, was considered by Laennec to be destitute of foundation. The dust, he observes, is quite dissimilar from the cretaceous formation occasionally met with in the lungs. Such productions he correctly regarded as the result of perverted secretion, and he had never met with them, except in dilated branches of the bronchiæ, or in the vicinity of old tuberculous excavations, cured by the formation of a fistula, or cartilaginous cicatrix. The production of cretaceous matter, he says, frequently succeeds that of tubercles.

Dr. Forbes coincides with Laennec respecting the secretion of the chalky matter; but differs from him in believing, with the

* See Laennec on Diseases of the Chest, p. 377. 2d edit.

† See Hastings on Inflammation of the Mucous Membrane of the Lungs, p. 273.

‡ Hecquet, *Maladies des Artisans*, tom. ii.

author of this work, that the habitual inhalation of dust of various kinds, is a frequent source of bronchial inflammation among various kinds of artisans, and more especially, in this country, needle-grinders, leather-dressers, and miners. An immense proportion of the miners in Cornwall, he says, are destroyed by chronic bronchitis, one cause of which is the inhalation of dust.*]

Exposure to THE VAPOUR OF MINERAL acids, or of metallic or other mischievous exhalations, is also frequently found to produce a permanent difficulty of breathing. This affection is peculiarly common to those wretched beings who are condemned by the laws of their country to work in metallic mines as an expiation of crimes proved against them; a melancholy and interesting picture of whom is given by Diodorus Siculus, in his description of the mines of Arabia and Ethiopia. The air-cells of the lungs are often found constricted to half their proper capacity; whilst, in many mines, the vapours are so irritable as to excite a perpetual cough. They are loaded, according to the nature of the mine, with oxides, sulphurets, or comminuted reguline particles of lead, copper, antimony, silver, arsenic. Metallurgists and the labourers in chemical laboratories are often severe sufferers from a like cause. Gold-refiners become dyspnoetic from inhaling the vapour of aquafortis. Etmuller gives an account of his having been seriously injured in his breathing while carefully superintending an antimonial preparation.† And Heurnius saw the lungs of a printer, so changed by inhaling an atmosphere impregnated with lead, as to resemble a shrivelled apple.

The treatment of this variety must be regulated by the variety of the cause; but, perhaps, in all cases a free inhalation of oxygen gas will be serviceable. An inhalation of moderately stimulant vapours, as of an infusion of lavender, marjoram, and, indeed, most of the verticillate plants, or of diluted wine-vinegar, has also proved frequently of use; to which may be added, a current of the electric fluid passed two or three times a day from the upper part of the spine to the diaphragm. An atmosphere, impregnated with tar heated over an oil or spirit lamp, has also in many instances been found essentially to invigorate the respiratory powers; and to these, where there is much cough, should be added expectorants and the warmer demulcents. After pursuing this plan for some weeks, pure air and the aerated mineral waters, where the case is not inveterate, will add a healthy degree of tone, and restore the respiratory organs to their natural action. Galvanism has also occasionally produced considerable, and, in some instances, permanent relief, after a few applications; the opposite wires being applied, the one to the nape of the neck, and the other to the lower part of the epigastric region, and each fixed upon a thin plate of metal wetted with water, as recommended by Dr. Wilson Philip.‡

We sometimes find a permanent difficulty of breathing in persons labouring under GREAT TORPOR OR SLUGGISHNESS OF VASCULAR ACTION. The pulse is slow and unresisting; the muscles are

GEN. III.

SPEC. I.

β D. chronica extranea.

γ D. chronica vaporosa.

Causes.

Remedial process.

Galvanism.

δ D. chronica phlegmatica.

Symptoms.

* See Laennec on Diseases of the Chest, &c., transl. by Forbes, p. 137. 2d edit.

† Rammazini, de Morbis Artificum. — Ephem. Vratisl.

‡ On Indigestion, &c. p. 379. 4th edit. 8vo. Lond. 1824.

GEN. III.

SPEC. I.

♂ D. chronica
phlegmatica.

Causes.

Medical treat-
ment.

♂ D. chronica
pinguetudinosa.

Description.

Treatment.

Venesection of
only temporary
use.
Remarkable
instance.

soon fatigued; the mind has little energy; the face is pallid; the skin cold and soft: the urine scanty, and the extremities œdematous, without any pathognomonic symptoms of dropsy in the chest, or at least any sensible fluctuation in the thorax. It is the *dyspnœa aquosa* of Cullen, and the *dyspnœa pituitosa* of Sauvages. Whatever has a tendency to depress the living power, and particularly in flaccid and atonic habits, will readily lay a foundation for this variety of dyspnœa; and hence it is a frequent result of catching cold in the feet, and, still more frequently, of suppressed perspiration. It also occasionally follows chronic catarrhs, and pneumonitis.

A tonic and gently stimulant plan, consisting of the warm gums, camphor and other terebinthines, the warmer bitters, the oxydes of zinc and iron, the compound squill pills, the warm-bath, moderate exercise, and a generous diet, will be the most successful mode of treatment; occasionally interposing antimonial emetics: which will relieve the lungs far more effectually than those of ipecacuan, as operating longer on the moving powers of the chest. Of the terebinthinate tribe, the best, perhaps, is the balsam of copaiba, given in doses of a drachm or a drachm and a half three or four times a day. Nothing succeeds so well in restoring the secretion of mucus where it has ceased or become deficient; or in producing a healthy discharge where its nature has been changed by morbid action: on which account, this medicine may almost be regarded as a specific in morbid secretions of mucous membranes, whether of the lungs, the intestinal canal, or the urethra; as it has often proved highly serviceable in croup. The chief difficulty is in devising a convenient form for its exhibition, since it sometimes excites nausea.

The variety of least moment, perhaps, to the dyspnœtic patient, is that which proceeds from, or is accompanied with, a short, stunted figure, and considerable corpulence, or, at least, OBESITY OF THE CHEST. We see persons of this description, significantly described by the colloquial term *pursy*, pant, and perspire, and grow fatigued, day after day, upon very little exercise, and yet press on without any serious inconvenience to a late period of life; or, if they sink suddenly and sooner, they yield rather to apoplexy as a result of their general habit, than to the idiopathic affection before us. [According to Laennec, this case is in a great measure nervous, and is to be attributed to the great expenditure of nervous influence, required to move a mass so disproportioned to the ordinary powers of motion.*] Abstinence from spirits, wines, and fermented beverages, a meagre allowance of animal food, a soluble state of the bowels, and exercise, rather persevering than violent, will form the best plan for the present ease, and the best guard against threatened mischief. Bleeding has often been tried, but it affords only temporary relief. Sauvages gives us the history of a female, who for two years had been so far suffocated, that it had often been judged necessary to bleed her three times a day at least, and she had undergone not fewer than two thousand venesections, when she applied to him. She was plunged into a warm-bath, the bath was frequently repeated, and friction at the same

* Op. cit., p. 404.

time made use of, so as to excite violent perspiration: by this means she was convalescent in ten days.

Dyspnœa has also sometimes been produced by causes somewhat more singular, as common respirable air obtaining an entry into cavities in the chest, or to which it does not naturally belong. Stoll gives a case of dyspnœa, in which air-bladders, or vesicles, were seated on the surface of the lungs.* [This state is particularly described by Laennec in his valuable account of emphysema of the lungs: after mentioning the enlargement of the air-cells, he says, sometimes we observe on the surface of the lungs single vesicles, distended to the size of a cherry-stone, or even larger, quite prominent, exactly globular, and apparently pediculated. The term *apparently* is used, because, on cutting into them, we find that there is no real pedicle, but merely a constriction at the point where the cell begins to rise beyond the surface of the lungs. The dilated cell, in fact, communicates with the adjoining ones and the bronchiæ; and the case is not one of a mere extravasation of air under the pleura. What he calls pulmonary emphysema consists essentially in the dilatation of the air-cells; and the projection of air on the surface of the lungs, constituting the larger and more prominent vesicles, is a posterior affection, and of slight importance, compared with the dilatation of the cells; because hopes may be entertained of its removal by absorption, while we cannot well see how nature or art can remedy the other morbid alteration, which, however, Laennec does not pronounce absolutely incurable.†] Gooch and various others mention examples of air let loose between the lungs and the pleura. In Timæus we have a specimen of a very extraordinary idiosyncrasy, giving rise to a difficulty of breathing upon an inhalation of the smell of roses.‡ The morbid influence of metallic action is not confined to vapour locally applied; for in Schenck we have a case of dyspnœa produced by mercurial inunction§; and, in other books, of a like effect on peculiar constitutions by a solution of the oxydes of lead taken internally, or even applied externally. ||

[According to Laennec ¶, some of the air-cells of the lungs of subjects, who have long suffered from any kind of dyspnœa, are almost always found preternaturally dilated. In other words, these organs are in a state of *vesicular* or *pulmonary* emphysema, which he distinguishes from the *interlobular*, well known to surgeons. He looks upon vesicular emphysema as being almost always the consequence of dry catarrh, and presenting the same indications of cure. "Frictions with oil are often very useful in lessening the susceptibility to be affected by catarrh. In the case of pallid, cachectic subjects, the subcarbonate of iron has occasionally seemed to have a similar effect, and to tend at the same time to diminish the congestion of the mucous membrane, and spasmodic stricture of the bronchiæ. In the severer asthmatic paroxysms, it is fre-

GEN. III.

SPEC. I.

ε D. chronica
pinguedinosa.
Singular
causes.

Vesicular em-
physema.

* Rat. Med., part vii. p. 135.

† See Laennec on Diseases of the Chest, and Mediate Auscultation, pp. 149. 152—163. 2d edit.

‡ Case, p. 216.

§ Observat. Rar., lib. ii. p. 63.

|| Eph. Nat. Cur., Dec. iii. ann. iv. obs. 30.

¶ Op. cit., p. 151. Transl. 2d edit.

GEN. III.
SPEC. I.
D. chronica
pinguedinosa.

Chronic
dyspnœa.

quently necessary to have recourse to venesection, in order to relieve the congestion of blood in the lungs; and it is always proper to diminish the necessity of respiration by means of narcotics."]

Chronic dyspnœa appears also as a symptom or sequel in various other diseases, or affections of various other organs; as aneurism, ossification, or other mischief in the heart, or aorta; any morbid change in the diaphragm, ribs, or pleura, by which the cavity of the thorax is diminished, or the moving powers restrained in their action; parabysmic enlargements of the liver, spleen, or omentum; whence it is obvious, that it must, in a greater or less degree, be an attendant on the latter period of pregnancy. It has also followed occasionally, not only suppressed perspiration, but the suppression of various cutaneous eruptions, and, in a few instances, the sudden closure of an issue, or seton, of long standing.*

SPECIES II.

DYSPNŒA EXACERBANS.

EXACERBATING ANHELATION.

THE DISEASE SUBJECT TO SUDDEN AND IRREGULAR EXACERBATIONS; BREATHING DEEP, STERTOROUS, ACUTE, AND SUFFOCATIVE; RELIEVED BY AN ERECT POSITION.

GEN. III.
SPEC. II.
How produced.

THIS species admits of most of the varieties of the preceding, which it is hence unnecessary to repeat; and, like it, is often found as a symptom in aneurisms, polypous concretions, and other affections of the heart and larger vessels; in parabysma, and other affections of the abdominal viscera; in empyema, dropsy of the chest, worms, peripneumony, bastard peripneumony, small-pox, and occasionally in severe accessions of intermitting fevers. I have already, indeed, stated, that there is scarcely a function with which the action of the lungs is not connected, and, consequently, scarcely a disease of any importance in which it does not occasionally participate. Whatever be the cause that produces anhelation,

* Riedlin, Lin. Med., 1695, p. 91. There is a form of dyspnœa, noticed by Laennec, and described by him as a "*besoin de respirer*," and by Dr. Williams, as a case of "*increased want of breath*;" a disorder which the latter physician refers to the venous condition of the blood being augmented beyond its natural standard. If not idiopathic, this affection, he thinks, cannot be ascribed to any distinct disease. It is to be detected only by the absence of the signs of every other cause: when, therefore, a dyspnœa occurs, whilst pure air is found to penetrate freely into every part of the lungs, and the diseases, which modify the state of the bronchial membrane and its secretion, have not existed, the disorder, as Dr. Williams conceives, must be necessarily referred to an unusually venous or carbonised state of the blood; the result, perhaps, of "an excessive formation of those secretions, which are, in relation to the blood, defective in carbon," (Cyclop. of Pract. Med.; art. DYSPNŒA), as, for instance, urea. Belladonna, stramonium, and conium, are the medicines which Laennec preferred for the relief of the "*besoin de respirer*." — Ed.

or permanent difficulty of breathing, in a patient, any accidental augmentation of it, or any sudden excitement of body or mind, or any diseased action of any kind, capable of uniting with the primary cause, directly or remotely, will increase its power, and not unfrequently induce a spasmodic constriction in the muscles of respiration. And it is this accidental exacerbation, produced irregularly by casual and often occult causes, and especially in irritable or nervous temperaments, that peculiarly distinguishes this species from the preceding. In asthma the returns are for the most part strictly periodical, and the intervals perfectly free from difficulty of breathing. In exacerbating dyspnœa, the constriction occurs with the utmost irregularity, in the day-time, at night, in hot or cold weather, in a moist or dry atmosphere; and it is hence sufficiently distinguished from asthma. A catarrhal cough will sometimes prove an occasional cause; several of the varieties of heart-burn, and especially *cardialgia syncopalis*, still more frequently; other causes are, indigestible food, a fit of hysterics, or any violent commotion or agitation: while, as already observed, the occasional cause is often beyond the power of detection.

When the constrictive paroxysm makes its attack, it must be immediately opposed by an erect position, without which suffocation would often instantly ensue; and by the most powerful antispasmodics. Tincture of opium, ether, and ammonia, are what I have chiefly trusted to, and have uniformly found far more to be depended upon than castor, or any other odorous antispasmodics, in whatever quantity given. A large blister to the chest should also be immediately applied; and, if the paroxysm do not yield soon, sinapisms to the feet. Upon its cessation, the gum-ammoniac mixture, or a solution of assafœtida, with camphorated tincture of opium, will be found a convenient guard against fresh attacks, provided due attention be paid to the state of the bowels, which ought indeed to form an early consideration. Issues have been recommended as a preventive of the paroxysm, where its approach has been expected, and I have sometimes thought them of efficacy. For this species, however, perhaps the most effectual means of relief are to be derived from the application of the voltaic battery, as already proposed for anhelation from poisonous vapours: and as has been successfully tried in numerous instances of the present species by Dr. Philip, who was first induced to apply this remedy from observing, that animals, whose eighth pair of nerves had been divided, exhibited the oppressed breathing and accumulation of phlegm that characterises both species of dyspnœa, and were relieved by having a stream of voltaic aura sent through the lungs.

The accompanying cough, instead of being increased by the use of the voltaic power, is hereby diminished, in consequence of its diminishing the accumulation of phlegm in the lungs. In proper asthma, which is characterised by intervals of free and healthy breathing, little or no benefit has been derived from this process; and hence Dr. Philip very ingeniously reasons, that, although in both diseases the nerves of the respirable organ are alone in a morbid condition, and not the brain or spinal marrow; yet, in the former, they are still capable of being recalled to a state of healthy activity, or of becoming sufficiently cleared to form a passage for

GEN. III.

SPEC. II.

Dyspnœa
exacerbans.

Present species
how peculiarly
distinguished
from the pre-
ceding; and
from asthma.

Therapia.

Sedatives and
antispasmo-
dics.

Blisters.

Issues.

Voltaic battery
as employed by
Philip.

Mode of action.

GEN. III.
SPEC. II.
Dyspnœa
exacerbans.

the supply of nervous influence to the lungs, which effect he supposes to be obtained by the use of the voltaic machine.

The American pathologists have found great benefit from various preparations of the *lobelia inflata*, or Indian tobacco, which certainly possesses powerful antispasmodic and expectorant virtues; and has hence a fair claim to more extensive trial than it has yet received. The ordinary form is that of a saturated tincture of the leaves, prepared by digesting two ounces in a pint of proof spirit: the dose of which is from a tea-spoon to a table-spoonful, repeated every half hour, or oftener, till the paroxysm is conquered. *

GENUS IV.

ASTHMA.

ASTHMA.

DIFFICULTY OF BREATHING TEMPORARY, RECURRENT; ACCOMPANIED WITH A WHEEZING SOUND AND SENSE OF CONSTRICTION IN THE CHEST; WITH COUGH AND EXPECTORATION. †

GEN. IV.
Nearly connected with
dyspnœa.

ASTHMA, as already observed under dyspnœa, is closely connected with the latter, and particularly with its second species, characterised by what might be strictly called asthmatic exacerbations, and which I have hence denominated *dyspnœa exacerbans*.

The definition of the disease now offered, while it shows the proximity of the one to the other, is sufficient, if I mistake not, to form a marked and accurate distinction. The vulgar term for the complaint in our own language is *broken-wind*; which, as scientific precision is seldom an object of popular language, is often also applied to some of the varieties noticed under dyspnœa, or *short-breath*.

Not common
in early life,
though some-
times found,
and particu-
larly in infancy.

Asthma is more commonly a disease of the later, than the earlier period of life; for it does not often appear in infancy or youth, although occasional instances of this have occurred, particularly in infancy, that have been mistaken for cases of croup, which the asthma of infancy very much resembles, though admitting of a

* A Treatise on the Materia Medica, &c. by John Eberle, M.D., 2 vols. 8vo. Philadelphia. 1822. Also Dr. Andrew's Report in Glasgow Med. Journ., vol. i. p. 177.

† "A difficulty of breathing, recurring in paroxysms, after intervals of comparative good health, and usually unaccompanied by fever." (Dr. Forbes in Cyclop. of Pract. Med., art. ASTHMA.) The greater number of writers agree in meaning by *asthma* "a disorder of the respiratory organs, characterised by intermittent or remittent dyspnœa, the attacks of which usually occur during the night, attended by circumstances, which are noticed more or less in all cases, where there is some obstacle to the mechanism of respiration." Jolly, Dict. de Méd. et de Chirurgie Pratiques, art. ASTHME. 1829. — Ed.

more easy cure.* It soon becomes habitual, and seems sometimes to be hereditary.

Asthma afflicts both sexes, but is more common in the male than the female. It makes its appearance in individuals of every variety of constitution, a necessary result, as Dr. Forbes remarks, of its frequent dependence on other diseases of accidental occurrence; but what are called nervous temperaments are those, in which the disorder occurs with remarkable frequency, and the same observation may be made with respect to plethoric individuals, with a full hard pulse, a short neck, high shoulders, a great deal of fat, and a voluminous head. It is supposed to be more common in temperate climates, than in either the very cold or the very warm regions of the earth. Frank found it more frequent in Poland than Italy.†

The paroxysms of asthma are frequently preceded by languor, flatulency, head-ache, heaviness over the eyes, sickness, pale urine, disturbed rest, and a sense of straitness, fulness, and anxiety about the præcordia. "When the evening approaches," says Dr. Bree, who unhappily describes from his own history, "the weight over the eyes becomes more oppressive, and the patient is very sleepy. Frequently, at this period, there is a tingling and heat in the ears, neck, and breast; and a motion to expel the contents of the bowels is attempted, with some violence, and with great uneasiness of the abdominal muscles. When an asthmatic feels these warnings, he may be convinced that his enemy is at hand."‡

The accession is usually about the middle of the night, and during the first and deepest sleep: the cause of which has not been rendered very manifest, though I do not think it beyond the reach of explanation, and especially in constitutions predisposed to the disease by habit, or hereditary affection. Respiration always takes place most easily in a raised or erect position, but in the night the body is recumbent. Respiration is also so much of a voluntary action, that although it continues during sleep, and when the will is not exerted, it is considerably aided by the concurrence of the will. Now, during sleep this concurrence is wanting; and hence the most favourable period for the attack of this insidious complaint is that, in which we actually find it makes its appearance — during a recumbent position of the body, when the muscles of respiration are destitute of the stimulus of volition. When the disease indeed has once established itself and become habitual, it will recur at other times also, but less frequently.

For the most part, the patient wakes suddenly, and feels a most distressing tightness about the chest, as if he were bound with cords: his anxiety is inexpressible, and he labours for breath as though every moment would be his last. He is obliged to sit erect, breathes distressfully with a wheezing sound, and cannot bear the weight of the bed-clothes. Cool fresh air is the object of his

GEN. IV.

Asthma.

Sex and climates in which it is most common.

Precursive symptoms.

Accession about midnight.

Why at this time explained.

Description.

* Asthma, according to the definition commonly given of it, is sometimes considered to be less a disease of old persons, than of adults not so far advanced in years; for the dyspnoea, and disturbance of the respiratory functions, often noticed in aged individuals, are mostly dependent upon organic diseases of the heart, or great blood-vessels, as M. Rostan has satisfactorily proved. — En.

† Forbes in Cyclop. of Pract. Med., art. ASTHMA; Frank. Med. Univ. Prax., tom. vii.

‡ Inquiry into Disordered Respiration, sect. iv. p. 46.

GEN. IV.
Asthma.

intense desire.* At the same time, the extremities are cold; the heart palpitates; the pulse is sometimes quickened, but usually weak, irregular, and often intermitting; the abdomen is distended with flatulence; the stomach is faint, and often rejects with great violence a slimy and frothy material of a greenish or yellowish hue. The eyes stare prominently, and the face is sometimes pale, but more commonly bloated and livid; and the alvine canal, though costive before, will now perhaps pass a loose stool.

Relieved by a
discharge of
mucus or
blood.

Paroxysm
often lasts
many hours,
and sometimes
returns the
ensuing night.

Often lasts for
a week or a
fortnight.

Has continued
for seven
weeks.

Not often fatal
at the time of
attack;

but occasionally
induces danger-
ous com-
plaints.

In many instances, there is an ineffectual effort to excrete, with a harsh and dry cough that brings up nothing more than a little clammy or frothy mucus. And, in these cases, the fit usually subsides, or perhaps altogether leaves the patient in two or three hours. But, in other instances, the cough is far more violent and suffocative; and when it has lasted for an hour or two, an expiration of tough viscid mucus commences, and gradually becomes copious and affords relief. It is occasionally mixed with blood from the severity of the struggle; but the larger the discharge of either, or of both, the more the bronchial vessels are relieved.

It is often, however, many hours before a paroxysm of this kind very sensibly subsides; and the patient generally feels some degree of constriction during the whole of the ensuing day; and is fortunate, if the next night be passed without a similar fit. The tendency to such returns usually continues for several nights; in severe cases, for a week or a fortnight. Sir John Floyer, who, from describing his own sufferings, has given us one of the best historical accounts of the disease that has ever been written, mentions a case, in which the fits recurred for seven weeks together; during the whole of which time the patient was obliged to sit erect in a chair.

Yet, notwithstanding the violence of the assault, it is not often that asthma, under either of these forms, proves fatal at the time: for this "*morbus maximé terribilis*," as it is called by Willis, "may be carried on to old age, if supervening diseases do not destroy the patient, or disturb the operations of nature, by which a recovery from the paroxysm may be obtained."† But it rarely makes a first attack without subjecting the constitution to subsequent returns; and frequently, by the debility which it hereby produces, lays a foundation for tubercular phthisis, dropsies of the chest or abdomen, aneurisms of the heart, and various other fatal diseases

* Dr. Forbes has known a poor patient, in such circumstances, not merely remain by the open window, but lean over it, resting on the sill, with the arm hanging on the outside, for several nights together, and even in winter. (Cyclop. of Pract. Med., art. ASTHMA.) Exposure to cold during a paroxysm of asthma rarely causes any immediate or subsequent ill consequences, a fact which appears to Dr. Forbes to prove how profoundly and extensively the nervous system is involved in the attack. — ED.

† Bree's Inquiry, &c. sect. VI. p. 71. Asthma hardly ever proves fatal as asthma, that is, in the paroxysm; but, as Dr. Forbes has very correctly explained (Cyclop. of Pract. Med., art. ASTHMA), its frequent recurrence not merely aggravates the pathological states in which it has originated, but leads directly to the production of other diseases. "The most common of these," he says, "are emphysema of the lungs, dilatation of the heart, hydrothorax, and other forms of dropsy. But," adds this well-informed physician, "if asthma is rarely fatal, it may be said to be almost as rarely cured, if this epithet is applied only to the entire and permanent removal of the disease. It is, however, frequently susceptible of great mitigation, and retardation of the paroxysms." — ED.

[which, however, according to the editor's reasoning, should generally be considered as causes, and not as effects of the disturbance of respiration]. Whilst it occasionally happens, even where none of these take place, that the mucous glands of the bronchiæ become relaxed, an habitual excess of secretion ensues, and a troublesome dyspnœa is the consequence, from the overloaded state of the air-cells and bronchial vessels; a mischief, which, in such cases, is felt most oppressively on first awaking, and is only relieved by a long labour of severe coughing. This overloaded state of the bronchiæ and air-cells, from too large a secretion of mucus, is, indeed, at the time, an original exciting cause of the disease; and has by some writers, and especially in our own day by Dr. Bree, been supposed to be the chief cause.

The exciting causes, however, are numerous, and it is difficult to say which is the chief; nor always easy to ascertain them satisfactorily. Yet they may all be resolved into an irritation of some kind or other, existing within the cavity of the chest, and stimulating its moving powers to a convulsive constriction.* I say existing *within* the cavity of the chest, because we are now considering asthma as an idiopathic disease. Yet it happens not unfrequently, that it occurs as a mere symptom, or result of some other disease, or of a morbid state of some remote organ, as the stomach, liver, or spleen; in which case, it becomes a secondary affection, and is only to be removed by removing the primary disorder on which it is dependent.†

[The ancients confounded, under the name of *asthma*, several varieties of dyspnœa, arising from different organic diseases, and which they very incorrectly regarded as nervous affections. To Corvisart and Rostan‡ belong the merit of having thrown a great deal of light on those varieties, in particular, which depend upon organic diseases of the heart and large blood-vessels.]

Whether the suffocative tightness of the chest be the result of a spasmodic stricture of the bronchial vessels, spreading thence to the muscles of respiration, or produced by an infarction of these vessels from a superabundant effusion from their exhalants, is a question of a very different kind. Willis first started the former opinion, which has flowed in a regular current, or with little opposition, through Floyer, Hoffman, and Cullen, to the present day. [Its possibility has lately received important corroboration from the anatomical researches of Reisseissen§, who has ascertained the existence of a set of completely circular fibres around the

GEN. IV.
Asthma.

Exciting causes numerous, but all resolvable into irritation of the chest.

Sometimes symptomatic and dependent on a remote organ.

Whether spasmodic stricture or mucous infarction be the common cause. The first advanced by Willis.

* On this part of the subject, what Willis has stated, is put, as Dr. Forbes has rightly observed, in pithy terms:—"Asthmatics can bear nothing violent or unusual. From excess of heat or cold, from any great bodily exertion, or mental emotion, from change of season or weather, from errors, even of a slight kind, in the non-naturals, and from a thousand things besides, they fall into fits of dyspnœa." *De Med. Op.*, p. 209. — ED.

† Amongst the predisposing causes may be enumerated hereditary transmission; malformation of the chest; small size of the glottis; excessive irritability of the bronchial membrane; and all diseases which directly affect it, as catarrhs, bronchitis, &c. But of all the predisposing causes of asthma, dyspepsia is the most frequent. — ED.

‡ L. Roston, *Mém. sur cette question: l'asthme des vieillards est-il une affection nerveuse?* Paris, 1809.

§ F. D. Reisseissen *Ueber den Bau der Lungen.* Berl. 1822

GEN. IV.
Asthma.

bronchial ramifications, beginning at the point where the cartilaginous circles terminate. Laennec has also verified the correctness of this observation upon branches of less than a line in diameter; and he remarks that, although it be difficult to follow the muscular fibres to a greater distance, analogy leads us to admit their existence, certainly in the smaller branches, and, perhaps, even in the air-cells. Adopting this view of the subject, he conceives that the spasmodic contraction of these fibres may take place in such a degree as to prevent the transmission of air to a great portion of the lungs. It is also further maintained by Laennec, that the study of respiration, by means of auscultation, furnishes us, both in health and disease, with proofs of the lungs possessing an inherent power of action. This author is too intelligent, however, to refer asthma exclusively to the operation of any single uncombined cause.*] Dr. Bree has lately proposed the second doctrine above specified, and supported it with great ingenuity and learning; illustrating and fortifying his views by numerous references to unquestionable facts, and the opinions of earlier writers. The same principle, or at least a modification of it, has been adopted by Dr. Parry, who places the vascular turgescence in the mucous membrane lining the bronchial cells.

The second
by Dr. Bree.

Under the first
view, the convulsive action
is morbid at all
times and in all
degrees.

Under the second,
only when
in excess.

Admitting the former hypothesis, the thoracic convulsion is a diseased action from the beginning, and under every degree and modification, and is so regarded by its advocates: while Dr. Bree only allows it to be so when the convulsive action is violent; contending that in its commencement it is altogether a remedial effort, an instinctive attempt to expel the serum or mucus that clogs the bronchial vessels. And he hence accounts for the pathognomonic wheezing, which he does not think the idea of a spasmodic stricture of these vessels is sufficient to explain; as also for the general inefficacy of opium and antispasmodics, to whatever extent they may be carried.

Difficulty
of regarding
secretion as the
general cause.

I have already stated, that an excessive secretion from the exhalants of the bronchiæ may be an exciting cause in many cases, and particularly in a relaxed and debilitated condition of the bronchial vessels in consequence of former attacks. But, notwithstanding the masterly manner in which Dr. Bree has argued this point, I cannot regard such a secretion as a common cause of asthma, since, in numerous instances, I have observed, in the words of Sir John Floyer, that "the lungs do not appear to be much oppressed with phlegm before the fit; and, at the end of the fit, the straitness goes off *before* any considerable quantity is spit up:" while in, what is commonly called, the dry, nervous, or convulsive asthma, there is always very little, and sometimes no mucus whatever, excreted from the beginning to the end of the paroxysm. It may, indeed, be maintained, that the secretion is absorbed, but this is to beg the question, for we have no proofs of such an absorption. The existence of accumulated mucus in the bronchial vessels of those who have died of asthma, and whose bodies have been opened, does nothing more than establish the fact in those particular cases. And even here we are left in total darkness, whether the serum or mucus anticipated the suffocative convul-

Especially in
dry or nervous
asthma.

* See Laennec on Diseases of the Chest, &c. 2d edit. p. 408.

sion, and was the cause of it, or whether the latter anticipated the serous or mucous effusion, and forced it into the vessels in which it has been found on dissection. How far the suffocative convulsion may originate in a spasm of the bronchiæ, as contended for by Dr. Cullen, we have no means of determining manifestly. That it may exist, however, as well as a spasm of the alimentary canal, no one has been bold enough to deny; that it must produce that strangling constriction or straitness which is a pathognomonic sign of asthma, where it does exist, can be as little doubted; and I find it extremely difficult to ascribe the disease to any other state of the bronchiæ, in all cases of dry or nervous asthma, in which, as there is little or no discharge from the lungs, we have full ground for inferring, that there is little or no accumulation within them. "It is not, however, intended," says Dr. Bree, "to deny the possible existence of this spasm, but to object to it as a proximate cause; and to state the imprudence of depending upon it as an important indication in practice."* Yet it does not appear to me, that the practice suggested by the one opinion, needs to be so much at variance with that suggested by the other, as this passage would seem to intimate. For, if acids prove a beneficial mode of treatment, and that benefit be ascribed by the upholder of the muculent hypothesis to the astringent power of the acid, by which the flow of mucus is restrained; it may be ascribed by the upholder of the spasmodic hypothesis to the very same power, by which, as a tonic, it takes off irritability, and allays all muscular irregularities.

[Laennec has divided the form of asthma in which no organic lesion is discoverable, into two kinds; in one, when the chest is examined with the stethoscope, the respiration is very sonorous, like that of children; and hence he calls the disease *asthma with puerile respiration*.† In this instance, the patient constantly feels the want of a more extensive respiration than what he enjoys. The dyspnœa is frequently very intense, and is sometimes so aggravated by the slightest motion, that the patient is condemned to a life of inactivity. Laennec ascribes the disease to the state of the nervous system. He has never met with this species of asthma, except in persons affected with chronic mucous catarrh. The other form of asthma, noticed by Laennec as unconnected with organic disease, is what he names, with other writers, *spasmodic asthma*.‡]

Dr. Bree's division of the disease is founded upon causes, rather

* Inquiry, &c. sect. vii. p. 106.

† Dr. Forbes has given the following explanation of what is revealed by the stethoscope, which "conveys scarcely any respiratory sound during inspiration, except an indistinct hollow sort of murmur, altogether unlike the usual respiratory sound, and so slight as to leave it doubtful if the impression conveyed to the ear is really a sound or vibration. Expiration, however, is distinctly marked over the greater part of the chest; not, indeed, by the sound of healthy respiration, but by a loud, sibilant, or dry sonorous rhonchus, corresponding with the loud sighing wheeze, audible by the naked ear. This rhonchus is often exactly like the sighing of wind through crevices; and sometimes the tone and key of the sound approach nearer those of a moan than a sigh. The sounds are perceptible during expiration over the whole chest, even in the extreme points of the lungs; and equally so in patients, whose respiration is nearly inaudible in the intervals of the paroxysms." Cyclop. of Pract. Med., art. ASTHMA. — ED.

‡ Laennec, op. cit., p. 405—407.

GEN. IV. Asthma.

And hence a spasm of the bronchiæ the most obvious cause in these cases.

The practice suggested by the one opinion not necessarily at variance with that suggested by the other.

Astama with puerile respiration.

Subdivisions as arranged by Dr. Bree from supposed causes.

GEN. IV.
Asthma.

than upon symptoms; and he has hence divided it into the four following species:—Firstly, those cases, being most numerous and common, which are produced by the irritation of effused serum in the lungs. Secondly, those produced by the irritation of aërial acrimony in the lungs. Thirdly, those dependent on irritation in the stomach, or some of the abdominal viscera. And, fourthly, those dependent upon habit.

[The author of the present work has not adverted to the valuable writings of Laennec on this subject, who shows, that the most common cause of dyspnœa, when of sufficient severity to be termed asthma, is a dry catarrh inducing emphysema of the lungs, that is to say, a preternatural dilatation of the air-cells. In some rare cases, where the progress of œdema of the lungs is very slow, asthmatic symptoms may also be produced. These morbid states have been amply verified by morbid anatomy.]

As the definitions, under the present classification, are founded upon a principle of symptomatology rather than of etiology, it will not be in my power to adopt Dr. Bree's divisions in the exact terms and order in which he has given them; though it will be found, that his first two species run nearly parallel with the only two to which I propose to limit the genus; and which will be wide enough to embrace his fourth, or those cases of the disease, which, whatever be their symptoms, depend on an established habit: while the third species of Dr. Bree, comprising cases in which asthma is not an idiopathic affection, but a sign or result of morbid action in some organ remote from the lungs, cannot be correctly treated of in the present place; the affections included under it being alone to be remedied by remedying the primary disease on which it is dependent.

From the view, then, thus offered, and from other symptoms that we shall have presently to take notice of, it will, I think, be found convenient to contemplate the genus *ASTHMA*, as comprising, and limited to, the two following species:

1. *ASTHMA SICCUM*.

DRY ASTHMA. NERVOUS ASTHMA.

2. *HUMIDUM*.

*HUMID ASTHMA. COMMON
ASTHMA.*

SPECIES I.

ASTHMA SICCUM.

DRY ASTHMA. NERVOUS ASTHMA.

PAROXYSM SUDDEN, VIOLENT, AND OF SHORT DURATION; CON-
STRICTION HARD, DRY, SPASMODIC; COUGH SLIGHT; EXPEC-
TORATION SCANTY, AND ONLY APPEARING TOWARDS THE
CLOSE OF THE FIT.

GEN. IV.
SPEC. I.
The convulsive
or nervous

THIS is the proper convulsive or nervous asthma of Willis, Hoff-
man, Floyer, and Akenside. Its predisposing cause we are some-
times capable of developing; for we can trace the disease to a

morbid structure of the chest, to an irritable condition of the bronchial vessels, or parenchyma of the lungs, produced by a pleuritis, or a succession of severe and protracted winter coughs; or to an hereditary source. Of the occasional causes, however, we are often in great ignorance; and mostly so where the disease appears in its simplest character, and totally unconnected with any other affection. In some instances, it evidently follows the sudden repulsion of cutaneous eruptions; in others, the sudden cessation of œdematous swellings in the extremities of cachectic patients; and, not unfrequently, the inhalation of deleterious exhalations: most of which we have already noticed as occasional causes of dyspnoea, and dry or humid cough. So that it is probably a mere difference in the constitution or habit, that renders these causes capable of producing one of these diseases, rather than another. And hence dry asthma, like the preceding, as thus diversified by its occasional causes, may be contemplated under the following varieties:—

- | | |
|--|---|
| α Simplex. Simple nervous asthma. | Without any obvious cause or connection with any other affection. |
| β Metastaticum. Repelled eruptions. | From retropulsion of some cutaneous affection. |
| γ Phlegmaticum. A cachectic frame. | From repelled œdema of the extremities in phlegmatic or cachectic habits, with a scanty secretion of urine. |
| δ Vaporosum. Deleterious exhalations. | From inhaled fumes of metals, especially of lead and arsenic; of sulphur, charcoal, nitric acid, and other deleterious or poisonous substances. |
| ε Organicum. Organic misformation. | From organic derangement of the walls or contents of the chest. |

THE FIRST OF THESE varieties constitutes the second species of Dr. Bree, who supposes the unknown and exciting cause to reside in some "subtile acrimony *always* present in the atmosphere in a greater or less degree, and ready to be inspired."* It is at least difficult to disprove this opinion; but, admitting the fact, we can make little use of it, and are nearly as much in the dark as ever.

It is a position of far more general assent, that this modification of asthma is more likely to occur "in proportion as the habit is disposed to the condition called nervous."† The paroxysm, indeed, frequently makes its attack under those circumstances, which are most apt to try the strings of a nervous temperament. A sudden emotion of the mind will give rise to it; an alteration of the wind, a change of residence, or a meal that disagrees with the stomach; and often there is a considerable evacuation of pale urine: while on the contrary, as already observed, it more usually makes its attack without any one of these harbingers, or any other that can be traced out. The small quantity of viscid mucus that is excreted through the whole of the struggle, proves evidently, that the inner membrane of the bronchial vessels is in a state of peculiar dryness;

GEN. IV.

SPEC. I.

Asthma
siccum.asthma of
Willis and
others.Predisposing
cause some-
times obvious.Occasional
cause often con-
cealed.α A. siccum
simplex.Whether from
acrimony in the
atmosphere.Found most
commonly in
nervous habits.

* Inquiry, &c. p. 192.

† Ibid., p. 191.

GEN. IV.
SPEC. I.
α A. siccum
simplex.

and leads us to conceive, that, at the onset, it was nearly or altogether destitute of its lubricating fluid. It is on this account that the cough and wheezing are both slight.

Laennec's
opinions.

[According to Laennec, an attack of purely nervous asthma is rarely fatal, and indeed is hardly ever so, without previously giving rise to congestions of blood, and other consequences of the disorder of the respiration and circulation induced by it: and, in these consequences, he observes, prejudiced minds may see the causes of the disease. He has met with many cases, however, in which it was impossible, after the most minute research, to find any organic lesion whatsoever, to which the asthma could be attributed. An instance of this is given by M. Andral in the case of a fatal suffocation, following the suppression of a discharge from an ulcerated leg.* M. Guersent records the cases of two children, who died in a few days of a remitting dyspnœa, attended with dry cough and præcordial anxiety, in whose bodies no obvious lesion could be found after death.† Laennec is convinced that, in the greater number of asthmatic cases, depending on dry catarrh and pulmonary emphysema, the asthmatic paroxysm can be induced equally by the supervention of a fresh catarrh, and by a deranged state of the nervous influence, occasioning pulmonary spasm, or an increase of the necessity of respiration, and sometimes by both causes at once. He believes, in fact, that few cases are owing to any one of these causes; and that, in old men particularly, several are frequently concerned. Of this kind are debility; ossification of the cartilages, and immobility of the ribs; rheumatism affecting the walls of the chest; and, perhaps, also, the tenuity of the air-cells, and of all the pulmonary vessels in advanced life. With the exception of the different kinds of catarrh, the occasional causes of the attacks of asthma are almost always such as are calculated to produce immediate and evident disturbance of the nerves; a strong mental emotion; venereal excesses; the influence of light and darkness; retrocession of gout; certain odours, such as those of tuberose, heliotrope, stored apples, &c.; changes of the atmospheric electricity, and other less appreciable conditions of the atmosphere. We find that the greater number of asthmatic patients cannot remain with impunity in a low close apartment, although containing much more air than they could consume in twenty-four hours; and although it is constantly, but insensibly, renewed by the doors and chimneys. Some cannot bear any person to go before them, or any thing to be brought close to them, without experiencing a sense of suffocation; while others are never more subject to dyspnœa, than in the midst of a large plain.‡]

β A. siccum
metastaticum.

Cases of the species of asthma before us, and even of humid asthma, occurring upon a SUDDEN DISAPPEARANCE OF scabid, herpetic, and other CUTANEOUS ERUPTIONS, are so common, that it is hardly worth while to dwell upon them. They are especially no-

* Clinique Méd., tom. ii. obs. 20.

† Dict. de Méd., tom. iii. p. 126.

‡ See Laennec on Diseases of the Chest, &c. 2d edit. p. 412. Dr. Henderson notices a disorder in India, exactly corresponding to our spasmodic asthma, and which appears to attack poor individuals, whom accident has deprived of their usual daily allowance of opium. The disorder attacks them with such violence, that, unless a sufficient quantity of this narcotic be provided for them, they die in a few hours. (Edinb. Med. and Surg. Journ.) This fact amounts to a convincing proof of the correctness of the term nervous asthma. — Ed.

ticed by Sir John Floyer, and have rarely escaped the attention of any pathologist since his day. And that this is an actual cause of the disease, is perfectly manifest from the subsidence of the latter as soon as such eruption has been re-excited. A sudden disappearance of gout in the hand or foot, or of an habitual discharge, as that of the hemorrhoidal vessels, has operated in the same manner, while a renewal of these affections has proved an equal remedy.

But those of relaxed and PHLEGMATIC HABITS are peculiarly affected by such transfers of morbid action, particularly when the feet and ankles are habitually cedematous, and accustomed to enlarge towards night. Chronic or exacerbating dyspnœa is a frequent attendant upon such a state of corporeal debility; and hence we have reason to expect asthma also: for further information upon which subject the reader may turn to what has already been observed under *dyspnœa chronica*.

It is not surprising, that asthma should be produced by the INHALED FUMES OF METALS, and other mineral substances, since we see it also frequently occasioned, in constitutions prone to the complaint, by clouds of common smoke or dust. And Dr. Percival informs me, that he has met with two cases, in which slight apoplexies were concomitants of asthma, produced by concentrated fumes of nitrous acid; here again leading to the same train of causes we have already noticed, as laying a foundation for chronic dyspnœa.

To this subdivision, also, belong such cases of asthma as proceed from fogs and mists, especially those of populous and extensive towns, which many asthmatics are obliged to abandon, as soon as November makes its appearance, for a drier and less hazy atmosphere. The coats of the bronchiæ seem to be constricted by the inhaled vapour; and hence the suffocative feeling. Where, however, the internal tunic of the bronchiæ is habitually dry and irritable, the moisture of such an atmosphere cools and softens the harsh membrane, and the patient longs for such a situation, instead of flying from it. And hence the reason why fogs are poisonous to some asthmatics, and healthy to others. It is also probable, that the altered gravity of the atmosphere, in these cases, and the larger and smaller doses of oxygen inhaled in every inspiration, produce some influence, that proves beneficial or injurious according to the habit or actual state of the air-vessels. And hence, again, while some asthmatics can only live in a mountainous situation, others find their only relief in lowlands and valleys.

An impregnation of the atmosphere with odorous essences, has also been found in a few cases of uncommon idiosyncrasy, or where the air-vessels have been peculiarly sensible, a sufficient cause of the asthmatic paroxysm; which has hence been produced by the smell of musk, and in one instance, related by Timæus, by that of roses.* And, in consequence, it is not to be wondered at, that more pungent and perhaps acuated corpuscles should produce a like effect. Dr. Scott, of Northumberland, has given cases of the greatest danger and extremity, occasioned by accidentally inhaling the effluvia of ipecacuan whilst pulverizing.†

GEN. IV.
SPEC. I.
β A. siccum
metastaticum.

γ A. siccum
phlegmaticum

δ A. siccum
vaporosum.

From odorous
essences.

* Cas. 216.

† Edinb. Med. Comment., vol. iv. p. 75.

GEN. IV.

SPEC. I.

ε A. siccum
organicum.

Another and a very frequent cause of both species of asthma, but more particularly the *asthma siccum*, is some organic derangement of the walls or contents of the chest. Gibbosity is one of the most common of the present group of causes. Lommius asserts, after Hippocrates *, that if a person become gibbous before puberty, in consequence of asthma, he dies.† On which Dr. Bree has well observed, that the authors have here substituted cause for effect ‡, since it is rather the gibbosity that produces the asthma, than the asthma that produces the gibbosity. An osseous and consequently rigid condition of the cartilaginous extremities of the ribs and sternum; ossifications of the pericardium, the valves of the heart, or the coronary arteries; pressure upon the lungs produced by a dropsy of the chest, or of the pericardium; by an empyema; by vomicae or indurated tumours of whatever kind in the substance of the lungs; an inordinate magnitude of the lungs themselves; have all been found occasional causes of asthma, and are among the most formidable to be attacked. Haller, Bonet, Morgagni, and others, who have been peculiarly attentive to structural diseases and their effects, have recorded numerous instances of this kind. And the later examinations of M. Rostan have added other morbid changes to those already noticed, in the heart indeed as well as in the lungs. In the first of these, he has very frequently found that particular kind of thickening of the left ventricle of the heart, to which the French have given the name of active aneurism: and, in the second, besides the morbid lesions already noticed, adhesions between the lungs and the pleura; effusions of serum into the cavity of the chest; and a general change of structure in the lungs, giving them a semblance of the organ of the liver. Several of these appearances are most probably effects of the disease, though by M. Rostan uniformly regarded as causes.

Paralysis; ossi-
fication of
diaphragm.

[It was strongly suspected by Laennec §, that, in some rare instances of asthmatic dyspnœa, an imperfect paralysis of the diaphragm, and other muscles of inspiration, was concerned. Rostan gives an instance of asthma connected with ossification of the diaphragm. ||]

Medical treat-
ment.

The general treatment of this distressing affection is still a matter of discussion. A considerable distinction is necessary in the two species under which it makes its appearance; and hence it will be more advantageous to defer the consideration of this subject, till we have noticed somewhat more at large the history of humid asthma, so that the plan, proper for the one, may stand in contrast with that proper for the other.

* Aph. XLVI. sect. 6.

† Lomm. Obs. Med., lib. II. p. 146.

‡ Inquiry, &c., p. 24.

§ On Diseases of the Chest, &c., p. 404. 2d ed.

|| When asthma is combined with some material imperfection, or disease of the organs of circulation and respiration, it is often difficult to offer a positive opinion, whether the latter circumstance is not consecutive, and gradually induced by the repeated attacks of the asthma. Then, we may also conceive, that various morbid affections and organic diseases, in asthma, are sometimes accidental attendants on it — not at all concerned with it either as a cause or an effect. Questions of this kind, as M. Jolly has well observed, are sometimes involved in difficulties, which have not yet been obviated by pathological anatomy. (Dict. de Méd. et de Chir. Pratiques, art. ASTHME.) No doubt, in a vast number of examples, in by far the greater number of cases, asthma is only a symptomatic disorder. — Ed.

SPECIES II.

ASTHMA HUMIDUM.

HUMID ASTHMA. COMMON ASTHMA.

PAROXYSM GRADUAL; INGRAVESCENT, PROTRACTED; CON-
STRICTION HEAVY, HUMID, LABORIOUS; COUGH SEVERE; EX-
PECTORATION COMMENCING EARLY; AT FIRST SCANTY AND
VISCID, AFTERWARDS COPIOUS AND AFFORDING GREAT
RELIEF.

THIS is the ordinary form under which the asthmatic paroxysm shows itself; and the trivial name of humid or humoral was given to it by earlier writers, most of them advocates of the humoral pathology, from an idea that an acrid humour was hereby discharged from the general mass of the blood, and consequently that the expuition was to be encouraged as much as possible; the suffocative struggle being regarded as an instinctive or remedial effort of nature to restore the system to a state of health.

GEN. IV.
SPEC. II.

Like the preceding species, it very generally appears without any obvious cause or connexion with any other affection. In some cases, however, it seems to be the result of a plethora, or, as Dr. Cullen expresses himself, "a turgescence of the blood, or any other cause of an unusual fulness and distention of the vessels of the lungs."* And sometimes, as in old age or after long continued and repeated catarrhs, it is produced by an excess of serum or mucus flowing inordinately from a weakened and relaxed state of the bronchial exhalants or mucous glands: thus offering us three varieties as follow:

Generally appears without any obvious cause; though sometimes the contrary.

α Simplex.
Simple humid asthma.

Without any manifest cause or combination with any other affection.

β Plethoricum.
From plethora.

From plethora, or the suppression of some accustomed sanguinous evacuation.

γ Atonicum.
From local atony.

From a debilitated and relaxed condition of the excretories of the air-vessels, as a consequence of chronic and neglected catarrhs, or of old age.

We also meet with examples of the humid as well as of the dry asthma, as a symptom or sequel of many other diseases; as gout, hypochondrias, hysteria, parabysma, and syphilis.

Occasionally symptomatic, or consequent.

I have already observed, that the attack of the present species is more severe, as well as of longer duration, than the preceding; as though the patient were contending with two hostile forces instead of with one—a diminished diameter of the vessels, and infarction from a surplus of viscid mucus: and thus both the exciting

The present species usually more obstinate than the preceding.

* Pract. of Phys., part II. book III. chap. VI. § MCCCXXXIV.

GEN. IV.
SPEC. II.
Asthma
humidum.
Reason of this.

causes co-operate, which have been contended for singly by the leaders of opposite principles. I am much disposed to think, that this is frequently the case; and that, to a certain extent, both hypotheses are correct. That asthma occurs, as in the preceding species, without any increased discharge of mucus, is unquestionable; that it occurs with such increased discharge, is equally incontrovertible.

Diagnosis.

But whatever be the source of the aggravated distress endured in humid asthma, after some hours of suffering the patient feels less anxiety, breathes more leisurely and with less labour; and, with a growing freedom of expectoration, acquires general relief and tranquillity. Yet such is the irritable state of the affected organs, that even on the second day "no change of posture is made with impunity, and particular distress affects him if he engage in the fatigue of dressing whilst the stomach is empty. During the day, if no particular hurry occur, the breathing becomes generally more free till the evening: an inexperienced asthmatic even flatters himself that his disease is leaving him; but he finds, at the approach of night, that he must sustain a new attack. The paroxysm recommences with the usual symptoms, and the night is passed nearly as the former; but the sleep is more perfect, and productive of more relief. The third day the remission is more complete, there is some additional expectoration, and bodily motion is performed with less distress, but still with great inconvenience. After the paroxysm has been renewed in this manner for three nights, the expectoration generally becomes free; but there is no certain termination of the fit at a fixed period. However, except in particular cases, it goes off after a few days; and as the daily remissions become more perfect, the urine is higher coloured, and in smaller quantities: the expectorated mucus is more copious and digested; strength of pulse and vigour of action increase; and good humour again enlivens the mind."*

General
treatment.

In TREATING asthma, our attention must be directed to the paroxysm itself, and to the nature of the constitution after the paroxysm has ceased; and, even during the paroxysm, to the character of the particular species, under which the disease shows itself.†

Bleeding.

Dr. Cullen, who, as we have already seen, regarded plethora and turgescence of the blood-vessels as the usual cause, recommends blood-letting in the first attack, and especially in young persons; with the use of acids and neutral salts, as employed by Sir John Floyer, for the purpose of taking off the congestion of the blood. Nevertheless bleeding demands a nice discrimination, and is rarely to be recommended in either species. The relief it affords, even in dry or convulsive asthma, is very temporary; and

Caution re-
quired in
bleeding.

* Bree, Inquiry, &c., sect. iv. p. 48.

† "The treatment of asthma, like that of all periodical diseases, consists of two parts; that proper in the paroxysm, and that in the interval." (Forbes, in Cyclop. of Pract. Med., art. ASTHMA.) As the same physician justly observes, when the treatment of asthma is spoken of, that of its chronic forms is generally signified; for what is called acute asthma is either a variety of bronchitis, or a violent congestion of the pulmonary mucous membrane, both cases requiring to be treated on principles applicable to such pathological states, with little regard to the spasm, which complicates it. These are truths, to which all practitioners must subscribe. — ED.

Dr. Cullen allows, that it cannot be persevered in without undermining the constitution, and laying a foundation for dropsy.

Dr. Bree regards it as a doubtful operation in the first species, or that, to adopt his own language, produced by ærial irritation, and as always imprudent in the second. In this last, "I have repeatedly," says he, "directed it; but I have never had reason to think that the paroxysm was shortened an hour by the loss of blood: and I have often been convinced, that the expectoration was delayed, and that more dyspnœa remained in the intermission, than was common after former paroxysms. In old people, who have been long used to the disorder, it is certainly injurious."*

Purging, beyond the intention of keeping the bowels regularly open, has seldom proved beneficial. When, indeed, the disease is secondary, and depends evidently upon an overloaded liver or stomach, or some suppressed evacuation, active cathartics, and especially such as operate simply, will be of great use; and the increased action excited in the alvine canal will often take off the irregular action in the chest; but where the asthma is idiopathic, and especially where the constitution is infirm, as in old age, a powerful alvine irritation will exacerbate the spasm of the chest, instead of diminishing it.

In exciting nausea or vomiting, however, we may be less cautious; for each has often been found highly advantageous in both species of idiopathic asthma. The first, by diminishing generally the living power, and hereby relaxing the convulsive action; and the second, by changing the seat of the convulsive action, and at the same time determining to the surface. [This practice has the sanction of Riverius, Akenside, Sir John Floyer, and Laennec, who says, that it acts on the nervous system, and is often followed by an immediate alleviation of the paroxysm.†]

Blistering may also be made use of, but, like setons or issues, can only be of ulterior advantage, for the fit must be of far more than ordinary length if it continue till the blister has produced vesication. It may, however, go far to prevent or shorten a relapse on the ensuing night; and especially when the disease is connected with an asthmatic habit.

Sir John Floyer is said, during his residence at Lichfield, to have found great benefit in his own case by the use of very strong coffee. And the practice was afterwards followed by Sir John Pringle, as he informs us, with equal success. "On reading the

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

Nauseating and
vomiting.

Blisters.

Coffee.

* Inquiry, &c., p. 245. According to Dr. Forbes (Cyclop. of Pract. Med.), it never puts an end to the paroxysm, much less does it cure the disease; and its habitual employment, in an affection of frequent recurrence, cannot fail to be highly injurious. It is indicated in the early attacks of young and robust subjects; in cases of great general plethora; in fits of great violence, in which the pulmonary circulation is much impeded, and the brain, or other important organs, are likely to suffer in consequence. — Ed.

† Laennec on Diseases of the Chest, &c., p. 418. 2d edit. Dr. Forbes approves of a dose of ipecacuanha when the paroxysm supervenes to a full meal, or occurs in a person having an habitually sluggish and loaded stomach; but he does not consider emetics generally useful. (Cyclop. of Pract. Med.) Akenside's practice consisted in giving ʒj. of ipecacuanha in the paroxysm to induce vomiting, which, he assures us, gave great relief; and, in the intervals, he gave gr. v. every morning, or gr. x. every alternate morning, these doses proving equally useful, whether they excited vomiting or merely nausea. Med. Trans. vol. i.

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

section on coffee, in the second volume of your Essays," says he, in a letter to Dr. Percival, "one quality occurred to me, which I had observed of that liquor, confirming what you had said of its sedative powers. It is the best abater of the periodic asthma that I have seen. The coffee ought to be of the best Mocha, newly burnt, and made very strong, immediately after grinding it. I have commonly ordered an ounce for one dish, which is to be repeated fresh after the interval of a quarter or half an hour, and which I direct to be taken without milk or sugar."*

Sedatives and
antispasmo-
dics.

Sedatives and antispasmodics, given alone, have rarely been attended with any decisive advantage. They have occasionally afforded relief in the first species, but have had little effect in the second; and, by heating the system unnecessarily, have often augmented and prolonged the paroxysm. Dr. Bree, in relating his own case, which was that of humid asthma, tells us, that, in the access of a paroxysm, he took four grains of solid opium, which produced nearly an apoplectic stupor for two days. A few hours after trying the opium, a most debilitating sickness supervened, with incessant efforts to puke. The labour of the respiratory muscles abated, but the wheezing evidently increased, accompanied with an intense headache and a countenance more turgid than usual; the pulse being at first strong and quick, and afterwards sinking into great weakness. The paroxysm showed itself four hours earlier than usual the next day. He tried it in smaller doses during several subsequent fits, but in no instance without great general mischief, and with little or no local benefit.†

Diaphoretics.

Much of this deleterious effect may have depended on idiosyncrasy. Sedatives and narcotics, if employed at all, should be combined with diaphoretics. In this form, they often prove a very powerful remedy: and one of the best preparations of this kind is the compound powder of ipecacuan. An universal glow and diapnoë, as it has been called, or breathing moisture on the surface, are among the most favourable symptoms of the disease, under whatever form it makes its appearance. Antispasmodics and narcotics, as musk, castor, valerian, cardamine, camphor, and the fetid gums, may, perhaps, be employed successfully when the disease is chiefly dependent upon a morbid habit; but even here they will derive a great advantage from an union with diaphoretics, as the neutral salts, and small doses of ipecacuan, or antimonial powder.

Hyosciamus,
and other nar-
cotics.

The hyosciamus has often succeeded, as a narcotic, where opium has failed: but, like the latter, it should not be trusted to by itself in either species of the complaint.

[Laennec conceives, that narcotics may act, not merely by lessening the necessity of respiration, but also by overcoming the spasm of the lungs. The following, he says, have been particularly

* See Percival's *Philos. Med. and Exp. Essays*, vol. iii.

† Many cases of asthma being connected with a state of the bronchial membrane, analogous to inflammation, do not seem likely to admit of benefit from narcotics. Hence, Dr. Forbes is of opinion, that it is only in cases of pure nervous asthma, or in those symptomatic dyspnoeas, simulating asthma, which depend on organic disease of the heart, &c., that opium and other narcotics and antispasmodics are at all likely to prove useful. In the hysteric asthma, the good effects of opium were long ago recognised by Willis. See *Cyclop. of Pract. Med.*, art. *ASTHMA*. — ED.

approved of: opium, belladonna, phellandrium aquaticum, aconitum, napellus, colchicum, tobacco smoked or taken internally, cicuta, dulcamara, hyosciamus, and the smoking of stramonium. The cases, in which he particularly recommends narcotics, are those seemingly attended with an extraordinary necessity for respiration, and a spasm of the lungs.

Besides narcotics, certain substances, which act powerfully on the stomach, or nervous system, have been tried, as the distilled water of lauro-cerasus, the nux vomica, tincture of cantharides, the arsenical solution, and the prussic acid. Laennec found the laurel-cherry water and diluted prussic acid ease the breathing, though less certainly, than narcotics. The same, he says, is true of the nitric, sulphuric, and acetic æthers.* With respect to the lobelia inflata, so much commended in America†, Dr. Forbes‡ has found it temporarily successful in certain spurious cases, produced by hydrothorax and disease of the heart; and even in the catarrhal asthma, he has known it check the paroxysm, if given at the commencement of the attack; yet he estimates its claim to efficacy below that of stramonium.

Where the urine is small in quantity, and of a pale hue, and particularly where the disease is connected with pituitous or phlegmatic habit, diuretics have been found serviceable. Dr. Ferriar combined them with opium.

But as there is no discharge that promises such direct benefit as that from the excretories of the bronchial vessels themselves, so is there no tribe of medicines on which we can place so much dependence as the expectorants, when judiciously selected and administered. In every kind of idiopathic asthma, these may be employed with advantage.

Among the fetid gums, which have been employed for this purpose, ammoniac has acquired the greatest degree of popularity: but, its power is inferior to that of assafoetida, the virtue of which is to be judged of by the degree of its offensive odour. Both these, however, are apt to be too heating, except in very flaccid and phlegmatic habits; and it will hence be often necessary to soften their pungency by a saline medium, taking care not to irritate the bowels unduly. And where there is a considerable degree of irritability and much quickness of pulse, we may prefer several of the oleraceous, and especially the mucilaginous demulcents: but oily demulcents are always to be avoided.

Of all the medicines, however, which act on the excernents of the lungs, the squill is the most to be depended upon. It is indeed a stimulant of the excernent system generally; for there is no part of this system capable of resisting its power: and it is hence necessary to watch its effects upon the kidneys and intestinal canal, and to attempt it with opium or some other guard, if it produce much influence in either of these ways; except, indeed, in the case of asthma connected with the phlegmatic habit, which is the only modification of the disease in which this collateral influence is found to be of advantage. Squills have also a peculiar tendency to stimulate the stomach, and produce nausea or vomiting; and it

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

Nux vomica;
prussic acid,
&c.

Diuretics.

Expectorants.

Fetid gums.

Demulcents.

Squills;

sometimes
with opium.

* Op. cit., p. 416, 417.

† Eberle's Mat. Med., Philadelph. 1822. Dr. Andrew, Glasgow Journ., vol. i.

‡ Cyclop. of Pract. Med., art. ASTHMA.

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

rarely shows much of an expectorating power till it has occasioned the former. But as these are advantageous to the disease in both species, and especially in humid asthma, we are not to discontinue it on this account, but only to moderate its use. Many practitioners, indeed, employ it directly as an emetic medicine, and prefer it to ipecacuan. In asthma it may, in some habits, be allowed to supersede it; but in no other disease that I recollect; for it is rougher in its action, and more offensive in its taste.

Seneka.

Where, however, the lungs seem to be affected only secondarily, and the source of the disease lies in an infarcted and torpid state of the liver or some other abdominal organ, squills, and indeed expectorants in general, will be found less serviceable, than in idiopathic cases. And hence, we should prefer the seneka root, which has often been found of great success, after calomel, or whatever other cathartic may be judged most proper, has been previously made use of. Seneka root, indeed, is in itself a sort of general evacuant; for while it increases very largely the discharge of mucus, it increases also the flow of perspiration and urine, and sometimes acts as an emetic and purgative.

Acids.

There is a tribe of medicines, which are also found of essential benefit in many cases of both species of asthma, but, with whose mode of action we are so little acquainted, that it has been explained on very different principles by different pathologists; I mean, the acids both mineral and vegetable. These principles we have not room to examine; nor is it necessary; since, if they be really beneficial, it is of little moment whether they act as sedatives in allaying irritation, or as tonics in invigorating the relaxed bronchial exhalants. The vegetable seem more efficacious than the mineral acids, probably because, in consequence of their being less corrosive, the patient can take them in larger quantity; and the vegetable acids, obtained by fermentation, seem more useful than the native.

Acids combined with
other medicines.

Yet these have rarely been given alone; for, by uniting them with diaphoretics, as small doses of ipecacuan, or with narcotics, the remedial power of each has been augmented; and the latter are not only rendered more efficacious, but are borne with less mischief afterwards. Sir John Floyer was in the habit of uniting the acetous acid with squills, and hence, indeed, the popularity which the vinegar of squills has preserved to the present day. Dr. Bree has employed both the vegetable and the mineral acids, but always in union with some other preparation. Thus in humid asthma, after emetics, he prescribes a draught composed of an ounce of distilled vinegar, and from one to three grains of ipecacuan in a sufficient quantity of pure water, to be taken every four hours, as a mean of determining to the surface of the body, and of promoting absorption and exhalation. And as a mean of taking off irritation and exciting the secretions of the bronchiæ, it may be also employed in nervous or dry asthma, and often with as good effect.

In like manner, Dr. Bree has made use of the nitric acid in union with squills and extract of henbane; giving three grains of the henbane with six minims of the acid and ten of tincture of squills in the form of a draught, and repeating it every three or four hours during the paroxysm. And he tells us, that "Many patients, who had taken the most powerful antispasmodics, have assured me, that

none had been so useful; and two gentlemen now under my direction inform me, that it is the only medicine that has ever given them relief in the paroxysms.* I cannot say that I have found it thus pre-eminently serviceable; but it has often been of decided benefit. And I know of no medicine that succeeds so well in preventing the mischievous effects of opium, and even in adding to its sedative power; or that is so valuable an adjunct in almost all antispasmodic preparations, and especially where ether, camphor, and other terebinthines are employed; or that tends so effectually to take off all excess of pungency from the more heating expectorants.

As simple relaxants are always hurtful in this disease, and only add to the debility, it is not to be wondered at that warm bathing should be also injurious. Cold bathing, as a tonic between the intervals, has much more to be said in its favour. Dr. Bree tried it in his own person, but did not obtain success. His was a case of humid asthma. But in the first species, and particularly where habit has given inveteracy to the recurrence of the paroxysms, and where the general constitution is vigorous, there is no single remedy likely to be of more value.

[In Dr. Wilson Philip's "Inquiry into the Laws of the Vital Functions," will be found various observations, tending to prove the utility of galvanism in one form of asthma.]

Wherever asthma may be supposed to be dependent upon plethora, tonics can have no claim to be employed, till after such a condition has been removed; and then, perhaps, the best medicine will be the mineral acids.

[When the asthmatic paroxysms have a strongly marked periodical character, cinchona, according to Laennec, frequently diminishes their severity, and sometimes stops them altogether.]

Peruvian bark is often found to overload the stomach, especially in dyspeptic patients, with whom I have found calumbo agree better, occasionally combined with carbonate of soda.† But the best tonics are the metallic oxydes, [and of these the subcarbonate of iron, given in doses from a scruple to a drachm, is praised by Dr. Bree and Laennec. The latter speaks particularly of its benefit in pallid relaxed habits, and both in the dry asthma and the nervous.‡]

Inhalations cannot well be tried during the paroxysms, but they have been very generally had recourse to in the intervals, and have consisted of very different vapours. When pneumatic medicine was at the height of its popularity, much benefit was supposed to be derived from the use of oxygen and hydrogen, and dilute chlorine gases. Dr. Beddoes was peculiarly attached to the former, and thus describes its effects with his constitutional warmth of expression:—"No sooner does it touch the lungs, than the livid colour of the countenance disappears, the laborious respir-

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

Bathing, hot
and cold.

Galvanism.
Prophylactic
treatment.
Tonics.

Gaseous in-
halations.

* Inquiry, &c., p. 285.

† Dr. Forbes believes, that bark possesses no specific powers in checking the return of the common asthmatic paroxysm; but, that it occasionally acts beneficially in two classes of cases; first, when the asthma is complicated with ague; and, secondly, when the stomach or general system is in a state in which a tonic of this kind is beneficial. — ED.

‡ On Diseases of the Chest, &c., p. 418.

GEN. IV.
SP. I. & II.
Asthma.
General
treatment.

ation ceases, and the functions of all the thoracic organs go on easily and pleasantly again." Yet, with all this high recommendation, few patients choose to be cured in this manner in the present day; oxygen gas is now rarely adverted to by asthmatics or their medical attendants; and the remedy, from having been extolled beyond its proper level, has fallen back into an unmerited disregard. Dr. Ferriar has spoken in more sober terms of the benefit of hydrogen in the first species; and I am induced to believe that a long perseverance in the use of this gas may often produce the effects he has ascribed to it; but it is rarely that I have seen it so decidedly useful as to ascribe the patient's recovery to this remedy, rather than to other means he had been employing at the same time.

Fumigations.

Warm aromatic fumes have been also tried; as prophylactics, obtained from various substances. The smoking of tobacco has very extensively been recommended; the leaves of the *scandia odorata* were at one time in still higher repute; but both have of late years given way to those of the *datura stramonium* or thorn-apple. Most of these contain a narcotic power, and whatever benefit they produce is hence, perhaps, chiefly derived: but either this narcotic power, or the stimulating power with which it is so intimately united, has at times been found to bring on a difficulty of swallowing.

Impregnated
aqueous injections.

Another process has lately been adopted in France, but of the issue of which we have not yet received any satisfactory information. It consists in a revival of the impregnated aqueous injections of Stephen Hales*, with a view of determining how far such impregnating materials may reach the lungs and be thrown off by the bronchial exhalants. Majendie and Nysten have been chiefly engaged in these researches, and they have ascertained, that alcohol, ether, camphor, and most of the other volatile antispasmodics, together with the gases, are in this manner conveyed to the lungs, and transpire from the surface of their air cells.†

Issues and
setons.

Issues, setons, and even cauteries, have been long in repute as useful drains or revellents; and under this character, are highly successful in the relief of asthma. And where the disease has appeared upon a sudden check of the cutaneous eruption, or a sudden cessation of any habitual evacuation, I can unite in this recommendation of Macbride‡ and Reidlin.§ Issues to this end, and, indeed, for all others, are most conveniently kept open, and produce the most salutary irritations, by small pieces of the bark of spurge-laurel or mezereon, both of which contain a very acrid matter; and the latter of which, more especially, has for this purpose been very generally employed in France, under the name of *écorce de Garou*.|| A lady, between fifty and sixty years of age, whom I have long been in the habit of attending, had several very severe fits of asthma, about three years ago, at the distance of ten days or a fortnight from each other. I discovered that she had been formerly subject, though at irregular periods, to slight bleedings from the hemorrhoidal vessels, which, for some months, had

Illustrated.

* Hæmostatics, ii. 74, 75.

† Précis Elémentaire de Physiologie, tom. ii. p. 291.

‡ Med. Observ. and Inquir., vol. vi. art. ii.

§ Lin. Med., 1695, p. 91.

|| Essai sur l'Usage et les Effets de l'Ecorce de Garou, par M. Archange le Noi. Paris, 1767.

ceased to be renewed. With a view of exciting a vicarious action, I opened an issue in one of the arms, and irritated the rectum by small doses of aloetic cathartics. The issue discharged copiously for six weeks, during which time the patient continued free from all attack: I then suffered it to heal slowly, still continuing the aloes; and about a month afterwards was informed, that the habitual discharge had returned. She had no paroxysm after this for upwards of two years.

Pontifex relates a case, in which a corpulent asthmatic patient, who suffered severely from frequent fits of this disease, was accidentally infected with the itch. As the eruption extended, his breathing became every day more easy; and, from the time that the contagion took place, he had no return of a paroxysm whatever. He was then desirous of being cured of the itch, and, for this purpose, went for several days successively into a cold bath. The eruption was hereby repelled; but he was immediately attacked with an asthmatic fit, which returned twice within the space of a month. M. Pontifex advised him to have recourse to his former cure, by using the bed-clothes of one infected with the itch. This advice he followed; a few days after which the scabid eruption made its appearance, when he was again perfectly liberated from his asthma.*

GEN. IV.
St. I. & II.
Asthma.
General
treatment.

Cured by
catching the
itch.

The diet should be light and cordial without being stimulant, and the food be of a solid, rather than of a liquid kind. All flatulent fruits and vegetables should be avoided; but oranges, the alliaceous esculents, and the aromata may be allowed in moderation. Hot liquors should be sedulously abstained from; and the beverage consist chiefly of coffee, ginger tea, and acidulated waters.

Diet.

Where asthma is dependent upon some primary affection of another kind, it can only be effectually treated by removing, or palliating, the original disorder.

GENUS V.

EPHIALTES.

INCUBUS.

SIGHING, SUFFOCATIVE ANHELATION, WITH INTERCEPTED UTTERANCE, AND A SENSE OF SOME EXTERNAL WEIGHT PRESSING HEAVILY ON THE CHEST; TRANSITORY.

EPHIALTES, incubus, night-mare, which are the common names in Greek, Latin, and English, for the present genus of diseases, though not exactly of the same meaning, import a sudden sense of

GEN. V.
Signification of
the generic
names.

* Recueil d'Obs. de Médecine des Hôpitaux Militaires, par M. Richard de Hautesierck, &c., tom. ii. 4to. Paris, 1774.

GEN. V.
Ephialtes.

an oppressive and suffocative weight on the chest, threatening strangulation, and rendering the person attacked incapable of changing his position. Ephialtes, from ἐφάλλομαι, signifies "to leap upon;" incubus, from incubo, "to lie upon;" and the term *mare*, in our compound night-mare, embodies the looser idea contained in the Greek and Latin denominations, and signifies a hag, goblin, demon, or spectre; as though the oppressive weight were occasioned by some such hideous monster's abruptly leaping or lying on the chest; whence our old Anglo-Saxon name for the disease, *Elf-sidenne* (*Ælf-sidenne*), or elf-squatting; which is as significant as any of them.

The character of the genus will be found sufficiently expressed in the foregoing definition.

If the generic definition be correct, as I trust it is, there can be no doubt that ephialtes belongs to, or should be ranged in close connexion with, the family of anhelations, under which it was usually classed by the earlier writers; and, indeed, continued to be so till the time of Dr. Cullen, who has strangely removed it to that of *vesaniæ*, or mental derangements, putting it immediately after mania; reducing it from a generic to a specific station; and as singularly uniting it with *sleep-walking*, with which it has little or no connexion in cause or symptoms, as will be sufficiently obvious from comparing the account about to be given of the one disease with that of the other.

Incorrectly
classed by
Dr. Cullen.

Appears most
frequently in
irritable tem-
peraments.

Usually in the
night-time,
after mental or
corporeal
fatigue, or a dis-
ordered sto-
mach.

The history of the affection will easily lead us to the nature of its production. It appears most frequently in persons of an irritable or nervous temperament, and of a weakly constitution; particularly amongst those who are predisposed to hypochondrias or low spirits. Others, indeed, are occasionally affected by it, but more rarely, and perhaps in a less degree. It usually, though not always, occurs in the night, during a reclined position, and after great fatigue of body or mind, or a stomach disordered by indigestible food, or food taken in excess.

Although, therefore, the symptoms of this complaint are to be taken from the actual state of the muscles and other organs of respiration, the exciting cause is to be ascribed, for the most part, to the actual state of the stomach, or the sensorium, or both:—more generally, indeed, to both, as the brain and the stomach are so much in the habit of associating in the same action.

Why such
causes should
produce such
an effect.

Yet how comes it that the organs of respiration should be thus singularly affected by the state of the stomach and the sensorium, and chiefly so in the night, rather than in the day? The solution of the question may be found in the reasons we have already offered, why the paroxysms of asthma, or of exacerbating dyspnœa, should mostly recur under similar circumstances, and at the same period.

Respiration
often assisted
by the will.

Respiration is a semi-voluntary action. In firm health, the will, indeed, is seldom applied to for its aid: but the moment the moving powers of the chest labour under any degree of debility, the will instantly interferes, and by its stimulus compensates for the deficient energy.

Digestion often
assisted by the
remedial power
of instinct.

Something like this applies to the state of the stomach, during the process of digestion. In healthful digestion, the ordinary action of the stomach is equal to its own demand: but the moment it labours under any degree of debility, or, in consequence of its

being overloaded, or loaded with indigestible materials, its ordinary action is not sufficient, it becomes necessary that it should be supplied, not indeed by the will, but instinctively, or by the remedial aid of the living principle, with an additional flow of nervous energy to enable it to meet the excess of duty hereby imposed upon it.

The surplus of sensorial power, under such circumstances bestowed upon the stomach, is taken from the general supply to the system at large, as from a common stock; every organ contributing its proportion, and, amongst others, the lungs. And if this demand, on the part of a feeble or overloaded stomach, should occur in a system, in which the general weakness of the respiratory organs is considerable; if it should take place in a recumbent position, in which they have, at all times, less power of action than in an upright posture; and if, moreover, it should be exhibited during sleep, in which the will itself, and most, sometimes indeed all, of the faculties of the mind are in a state of suspension, from a cause I shall hereafter have occasion to explain; almost every thing will co-operate to impede respiration, to lower the tone of the respiratory muscles, and consequently to excite in them irregular and spasmodic action; in one word, to lay a foundation for all the symptoms which characterize ephialtes: the mind, sympathetically disturbed and hurried in the midst of sleep, imaging to itself, at the moment, from the terrible sensation induced, as terrible a cause for its production, and giving full credulity to the presence of a huge and hideous spectre, tyrannically squatted upon the chest, and striving to take away the breath.

Now, in reverie, the will, as indeed all the faculties of the mind, may be as abstracted during the day, as they are suspended in sleep during the night: and from the peculiar strength and vivacity of the train of ideas or mental emotions that constitute the reverie, the same sudden exhaustion may take place, and the same inordinate demand upon the common stock of sensorial power, distributed throughout the system at large, may be made upon every organ acting under a common bond of sympathy, as we have just contemplated during the influence of sleep. And the respiratory organs being thus, in the same manner, mulcted of a part of their ordinary influx of nervous power, the same complaint may take place in the one period as in the other; though, the body not being recumbent in the day, the lungs will not sustain so violent a struggle; and the intellect, from its being less passive than in sleep, not so strongly imposed upon. [Although the foregoing hypothesis, respecting the cause of incubus, displays much ingenuity, the editor need scarcely observe, that what is stated amounts to nothing more than conjecture, liable to the very same objections which have subverted most other theories on the subject. Were it true, hardly any dyspeptic person with weak lungs, who eats too freely, could ever escape an attack of night-mare after going to bed. Yet this is quite repugnant to common experience. The disorder has sometimes been imagined to proceed from a stagnation of the blood in the sinuses of the brain, or in the vessels of the lungs, or from too great a determination of blood to the head. The horizontal posture during sleep, and the pressure of the stomach upon the aorta in a supine position, have been fancied to be

GEN. V.
Ephialtes.

The addition of sensorial power thus bestowed upon the stomach, taken from the system at large:

and hence from the lungs: which, in weakly habits, are still further debilitated: and especially during sleep. Whence impeded respiration:

and, from sympathy, frightful dreams, and night-mare.

From reverie, or any other abstraction of the mind, it may occur also in the day.

GEN. V.
Ephialtes.

sufficient to produce an unusual distention of the vessels of the brain; while, by others, the weight of the heart pressing on the left auricle and large pulmonary veins, has been suspected to produce the oppression and sense of weight and suffocation in the breast.* As Dr. Whytt† has observed, however, if these opinions were true, every person that lies upon his back, especially after a full meal, ought to suffer a degree of night-mare. Dr. Bateman considered it probable, that the seat of night-mare was chiefly in the stomach. The sympathy of this organ with the head, heart, lungs, and diaphragm, he says, is so remarkable, that there can be no difficulty in referring the several symptoms of incubus to a disagreeable irritation of the nerves of the stomach. A heavy or flatulent supper undoubtedly aggravates the night-mare in persons predisposed to it. Persons are mostly attacked while lying upon their back, because in this position the viscera make greater pressure on the diaphragm, and inspiration is less easy. The night-mare takes place only in sleep, because the strange ideas excited in the mind, in consequence of the disordered feelings of the stomach, are not then corrected by the external senses; nor do we then, by an increased respiration, or other motions of the body, endeavour to shake off any beginning uneasiness about the stomach or breast. The night-mare generally occurs in the first sleep, and seldom towards the morning, because at the earlier period the stomach is more loaded with food, and digestion is less advanced. It may be remarked, however, that neither a horizontal posture, sleep, nor heavy suppers ever produce the night-mare, at least, in any considerable degree, unless the person be already predisposed to the complaint by the particular condition of the nerves of the stomach. As far as practical considerations are concerned, there may not be any very important difference between our author's views and those of Drs. Whytt and Bateman, since he represents the imposition of too much work on the stomach as the exciting cause. And it is only in his *rationale*, that he lets his imagination take a random flight. With respect to his hypothesis of the cause of the day-mare, it may be noticed, that the case which he has inserted as an illustration of it, could not be connected with revery or abstraction of the mind, as it always took place *suddenly*, and at *regular periods*. Be this as it may, our author describes the two following species of the affection:]

1. EPHIALTES VIGILANTIUM.

DAY-MARE.

2. ————— NOCTURNUS.

NIGHT-MARE.

* See Bond, on Incubus, 1753.

† On Nervous Disorders, chap. 6.

SPECIES I.

EPHIALTES VIGILANTIUM.

DAY-MARE.

PRODUCED DURING WAKEFULNESS; THE PRESSURE SEVERE, AND EXTENDING OVER THE ABDOMEN; RESPIRATION FREQUENT, LABORIOUS, CONSTRICTED: EYES FIXED: SIGHING DEEP AND VIOLENT; INTELLECT UNDISTURBED.

THIS species is less frequently described by pathological writers than the ephialtes of the night season. Rhodius*, however, Forestus†, and Sauvages‡, have distinctly marked it; and a striking example of it occurred some years ago in my own practice.

Forestus gives a case that returned periodically every third day, like an intermittent fever. The patient was a girl nine years of age, and, at these times, was suddenly attacked with great terror, a constriction of both the upper and lower belly, with urgent difficulty of breathing. Her eyes continued open, and were permanently turned to one spot; with her hands she forcibly grasped hold of things, that she might breathe the more easily. When spoken to, she returned no answer. In the mean time, the mind seemed to be collected; she was without sleep; sighed repeatedly; the abdomen was elevated, the thorax still violently constricted, and oppressed with laborious respiration and heavy panting; she was incapable of utterance.

This case seems to be founded upon a highly irritable or spastic diathesis, and makes some approach towards ecstasis and catalepsy; but, with that intolerable weight on the chest which peculiarly marks ephialtes. No exciting cause is stated. A predisposing cause I have already hinted at, and shall briefly advert to the treatment under the ensuing species.

GEN. V.
SPEC. I.
Less frequent
than night-
mare.

Illustrated.

Makes an ap-
proach towards
ecstasis and
catalepsy.

* Cent. I. observ. 54.

† Lib. x. obs. 52.

‡ Class v. ord. I. Anhelationes Spasmodicæ, gen. I.

SPECIES II.

EPHIALTES NOCTURNUS.

NIGHT-MARE.

PRODUCED DURING SLEEP, AND INTERRUPTING IT WITH VIOLENT STRUGGLE AND TREMOR: THE PRESSURE ON THE CHEST SEEMING TO BE THAT OF SOME HIDEOUS MONSTER, OR PHANTOM.

GEN. V.
SPEC. II.
Usually preceded by some fearful dream.

THE sensation is said to be frequently preceded by some fearful dream, as that of an implacable enemy, known or unknown, in close pursuit of the dreamer, from whose grasp he feels incapable of escaping; or of exposure to some overwhelming danger by sea or land, as that of falling from a steep precipice; or struggling, amidst the ruins of a shipwreck, with rocks and breakers that threaten to dash him to pieces every moment. This I believe is often the case; and particularly when the state of the brain, rather than that of the stomach, forms the exciting cause.

Not always accompanied with hideous ideas.

The attack, however, appears to be sometimes slighter, and unaccompanied with such fearful scenes of desperate adventure,* or the machinery of hideous and appalling demons or monsters; for Fortis gives the case of a young woman, who, during the paroxysm, supposed herself to be pressed upon by a man who was very far from being disagreeable to her; yet awoke from this imaginary concubinage with the usual sense of oppression, the voice and breath interrupted, great anxiety, and the face covered with sweat.* And similar cases, according to Craanen, Heurnius, and Forestus, have occurred to men as well as to women. While we are told by Pliny, that the oppression, in his day, was ascribed to the sports of fauns, an idea rather pleasing than hateful to the imagination; and that the disease was hence denominated faun-gambols, *ludibria fauni*.

Among the Romans ascribed to the gambols of fauns.

Medical treatment.

The treatment may be stated in a few words. The mind and body should be kept free from all undue fatigue and commotion, and the diet be light, especially towards the evening. The action of the bowels should be kept regular; and, perhaps, as Dr. Darwin recommends, a mattress or harder bed than usual should be used, and an alarm clock hung up in the room, so that the sleep may be interrupted at short intervals. [The patient should sleep with his head raised on high pillows, and lie on his side. If the functions of the stomach be much disordered, the directions already given for the relief of dyspepsia and other affections of this organ should be followed.] These plans will supersede the use of the feeble medicines which were formerly in vogue for the cure of night-mare, as saffron and peony, and will render superfluous all further inquiry into a subject which once exercised the pen of the learned, whether the latter was or was not a specific in the form of an amulet.

* Sauv. Nosol., Meth. I. 631.

GENUS VI.

STERNALGIA.

SUFFOCATIVE BREAST-PANG.

VIOLENT PAIN ABOUT THE STERNUM, EXTENDING TOWARDS THE ARMS; ANXIETY, DIFFICULTY OF BREATHING, AND SENSE OF SUFFOCATION.

THIS disease is described by modern writers under the names of *angina pectoris*, *syncope anginosa*, *asthma dolorificum* or *arthriticum*, *orthopnœa cardiaca*, and various others of a similar import, that clearly discover its relationship to the genera which have just passed in review before us. It has characters, however, sufficiently marked to separate it from all of them, and particularly from those under which it has hitherto been ranked as a species or subdivision. And I have, in consequence, been under the necessity of giving it a new denomination, as well as of assigning it a new place: and hence the above name of STERNALGIA (ΣΤΕΡΝΑΛΓΙΑ); a compound importing "pain about the sternum," which is a striking pathognomonic symptom, if not the leading feature of the affection. It is here it differs essentially from syncope and asthma, neither of which terms, therefore, ought to have been appropriated to it; while it has still less connection with angina, in its common sense of quinsy, although this is the name by which, from the time of Dr. Heberden, it has been most frequently denominated.

GEN. VI.
Synonyms.

Present name.

M. Brera, an Italian physician of deserved eminence, but whose work * the author was unacquainted with till after the first edition of the present, has entitled it *sternocardia*, and M. Portal has preferred this term to *angina pectoris*. Its chief objection is a derivation from two distinct organs, as the seat of disease.

Synonyms.

The genus offers us two species:—

- | | |
|----------------------------|----------------------|
| 1. STERNALGIA AMBULANTIUM. | ACUTE BREAST-PANG. |
| 2. ————— CHRONICA. | CHRONIC BREAST-PANG. |

SPECIES I.

STERNALGIA AMBULANTIUM.

ACUTE BREAST-PANG.

SUPERVENING SUDDENLY DURING EXERCISE; WITH TENDENCY TO SYNCOPE: RELIEVED BY REST.

It is singular, that there is no description which will fairly apply to this genus under either of its species, in any of the writings of the Greek, Roman, or Arabian authors that have descended to us.

GEN VI.
SPEC. I.
Not known in
early times.

* Della Sternocardia. Verona, 1810.

GEN. VI.
SPEC. I.
Sternalgia
ambulantium.

Some few passages have been quoted as possibly referring to it; but, on examination, they will be found too general for the purpose, or evidently intended for some other affection. Such particularly is the *asthma pneumodes* of Aretæus, referred to by Swediaur, who has distinguished the disease in his Nosology by the name of *pniophobia*. And hence, considering the minuteness with which many of the writers thus adverted to have followed up all the morbid affections of the human frame, and the accuracy with which they have described them, the most reasonable conclusion is, that, like rickets and several other diseases, it was not known to them, or, in other words, was not in existence.

First glances
at it.

The first glances at it, which we are any where capable of tracing, are to be met with occasionally in the works of Morgagni*, and somewhat more distinctly in the *Consultationes Medicæ* of Hoffman. Dr. Letherland has followed up the inquiry with a curious spirit of research in the Edinburgh Medical Commentaries†, and has quoted a passage from the works of Poter, which renders it highly probable, that this writer was well acquainted with, at least, the first species of the genus, and was aware of its being often fatal. Poter's description of the disease is as follows:—"Respirandi difficultas quæ per intervalla deambulantibus incidit; sic ut plurimum derepentè moriuntur."‡ But it is to the late Dr. Heberden that we are indebted for the first full and perspicuous account of sternalgia, or, as he calls it, *angina pectoris*.§

First clearly
described by
Heberden.

Dr. Cullen has not noticed the complaint either in his Nosology or in his First Lines; but he has entered it with the unsatisfactory name of *angina pectoris* in his "Catalogue of Omitted Diseases."||

And since by
numerous
writers.

It has, however, been minutely described and well illustrated, both historically and practically, by many modern writers of established reputation, as Dr. Fothergill, Dr. Duncan, Dr. Percival, Dr. Darwin, Dr. Macbride, Dr. Hamilton, Dr. Haygarth, and Dr. Parry, most of whom have accompanied their descriptions with a speculative inquiry into the causes of the complaint.

Pathology.

Sternalgia rarely attacks the young, or those who are under five-and-forty or fifty years of age. Persons with short necks, inclined to corpulency, or of a gouty temperament, and especially when indulging a sedative life, are peculiarly predisposed to it. The form it first assumes is commonly that of the present species, by far the most severe, and, as Poter correctly observes, the most frequently fatal: for when the constitution has been for some time habituated to the paroxysms, though it often becomes greatly debilitated by them, and the paroxysms themselves increase in duration, it passes through the attack with less violence and immediate danger.

The present
species more
fatal than the
chronic.

Symptoms.

The incipient assault is usually felt while the patient is walking, and especially if he happen to be walking soon after eating, or during the process of digestion. He complains of a new and painful sensation in his breast, spreading up to his arms. At first, perhaps, this extends no farther than to the insertion of the deltoid muscle, and more commonly on the left side than on the right; but

* See especially Epist. xxiii. art. 8, 9.

† Vol. iii. p. 180.

‡ Poterii Op. Cent. 3. No. 22.

§ See Med. Trans., vols. ii. and iii.

|| "Catalogus Morborum à nobis omissorum, quos omisisse fortassis non oportebat."

it soon winds its way to the elbow, wrist, and fingers' ends. In this incipient state, he sometimes loses the pain suddenly and entirely by merely standing still. Yet it rarely continues more than from half an hour to an hour, even under its most severe assault, and where it proves fatal. There is sometimes connected with it a strong feeling of flatulency at the stomach, with momentary ease on eructation. The face, moreover, is often pale, and the body bathed in perspiration.

Whatever exercise the patient is engaged in when the paroxysm attacks him, he feels that a perseverance in it would produce a total suspension of living power; and hence, if he be walking, and especially against the wind, he turns from the wind and stands still; when, if the complaint be slight, and, in its infancy, it soon vanishes.

In one instance, a patient thus attacked, and who was distinguished for great firmness of mind, had the resolution to continue walking, and found the pain go off after it had affected him from five to ten minutes.* If by a like degree of courageous effort, the patient, in struggling for breath, be able to overcome the constriction, he will continue able through the remainder of the fit to make a deep inspiration, though accompanied perhaps with sighing and some difficulty of expiring his breath. In other instances, however, an equal degree of firmness has been exerted in vain. In most cases, the pulse, during this contest, varies but little, yet it is sometimes quickened, and sometimes intermits; while, in a few instances, the heart palpitates considerably, though less so than in the chronic species.

A habit of return is soon induced after a few fits have paved the way; and when this is effected, the action of walking is not necessary for its production, for it will sometimes be brought on by the most trivial circumstances, as coughing, swallowing, going to stool, or a slight disturbance of the mind. And, in this case, the first species becomes converted into the second. "One," says Dr. Heberden, "has told me that this complaint was greatest in winter; another, that it was aggravated by warm weather; in the rest, the seasons were not suspected of making any difference."† The pulse is not only little affected, as already observed, during the paroxysm, but even in the intervals; being, for the most part, only a little quickened, and seldom exceeding eighty strokes in a minute; in one instance, even where the semilunar valves of the heart were afterwards found ossified, and the ossification had extended to the aorta itself, the pulse, though small, never exhibited irregularity.‡ Yet, in a few instances, I have found it not only irregular but intermittent; and intermittent for some weeks after the paroxysm had ceased to return. In others, it has been strong and vibratory.

The cause is very obscure, and the more so as the disease has often been found in persons labouring under different sorts of structural derangement about the heart, or in one or more of the organs of respiration, to which it has been ascribed, as soon as such derangements have been discovered; while, in other cases, nothing of the kind seems to have existed. Thus the cartilaginous portions

GEN. VI.
SPEC. I.
Sternalgia
ambulantium.

In slight cases
conquered by
firmness of
mind.

Firmness of
mind some-
times exerted
in vain.

A habit of
return soon
produced.

Pulse not
greatly varied.

The cause
obscure:

and hence
ascribed to a
morbid state of
very different
organs.

* Parry, Treatise on Angina Pectoris.

† Medical Transactions, vol. ii. p. 61.

‡ Id. Letter from Dr. Wall, vol. iii. p. 16.

GEN. VI.
SPEC. I.
Sternalgia
ambulantium.

of the ribs have sometimes appeared ossified on examination after death; sometimes the semilunar valves of the heart; and sometimes the coronary arteries: and hence Dr. Wall has ascribed the disease to the first or second of these morbid changes *, and Drs. Heberden and Parry to the third †, who have been followed by Burns and Kreysig. Dr. Cuming found the heart itself double its natural size, with some kind of morbid change in several of the surrounding organs. ‡ Dr. Haygarth, on one occasion, found the mediastinum in a state of suppurative inflammation, and has hence regarded this as the cause §; while, as the pericardium has sometimes evinced concretions of blood, Dr. Hooper and others have referred the disease to this affection. || Dr. Hosack conceives ¶, “that it most frequently arises from a plethoric state of the blood-vessels, more especially from a disproportionate accumulation of blood in the heart and large vessels;” an opinion more in accordance with the observation of Dr. John Forbes, than any of the others. ** Dr. Darwin mentions it as a sort of asthma, producing a cramp of a peculiar kind in the diaphragm, or the other muscles of respiration; while a very large number of pathologists, among whom may be mentioned Elsner ††, Benger ‡‡, Dr. Butter §§, and Dr. Macqueen ||||, have endeavoured to account for it as a particular species of gout: and hence Dr. Berger attacked it with gum guaiacum, which, in his paper upon this subject in the Copenhagen Transactions, he asserts to have been particularly serviceable. Dr. Latham has, in various instances, found it in persons who, possessed of sound chests and apparently untainted constitutions ¶¶, were affected with enlargements of the abdominal viscera, or other diseases seated in these organs.

Many of these are, perhaps, predisposing causes: yet some of them may be effects.

Hence not necessarily dependent on structural derangement.

That there is a violent and painful constriction of some of the muscles about the sternum during the existence of the paroxysm, and that respiration is hence greatly impeded, is unquestionable; and that many of the above misformations of structure, or constitutional habits, may occasion a predisposition to sternalgia, is highly probable; but they give us little or no information concerning the cause that immediately produces it; while it is by no means unlikely, that several of these morbid changes, thus brought forward as causes, are themselves only effects of so laborious and perilous a struggle. And hence we cannot, I am afraid, in our present defective knowledge of the physiology of the disease, do more than adopt the modest opinion of Dr. Bergius and Dr. Heberden, and regard it as dependent upon a cause that has not yet been traced out, but which does not seem to originate necessarily in any structural derangement of the organs affected.

* Medical Transactions, vol. iii. art. ii.

† Treatise on the Syncope Anginosa, commonly called Angina Pectoris.

‡ Case of Diseased Heart, &c. Dublin Reports, vol. iii.

§ Medical Trans., vol. iii. art. vi.

|| Mem. of the Med. Sor. of Lond., vol. i. 19. 21.

¶ Americ. Med. and Phil. Regist., vol. ii. p. 366.

** See note in transl. of Laennec on Diseases of the Chest, 2d edit. p. 692.

†† Abhandlung über die Brustbräune. Königsburg.

‡‡ See Algem. Deutsche Bibl. xxxvi. 125.

§§ Treatise on the Disease commonly called Angina Pectoris. Lond. 1791.

|||| Lond. Med. Journ., vol. v.

¶¶ Medical Transactions, vol. iv. art. xvi.

The variable state of the pulse, and the occasional palpitation of the heart, are best accounted for by supposing some such structural disease as we have just seen occasionally exists there. Yet even these symptoms may depend upon the habit or idiosyncrasy, and appear to have occurred, in a few instances, in which dissection has discovered no such manifest local cause. So far as I have witnessed the disease, it has commenced in the respiratory muscles with a suffocative struggle, and tense constrictive pain: and it has not been till a minute or two afterwards, and where the spastic action has extended in different directions, that the pulse has varied, or palpitation ensued: as though the primary seat of disease was in these muscles, and the heart was only affected secondarily.

[Laennec considers *angina pectoris* as a variety of neuralgia of the heart. The doctrine of the disease being always the effect of some organic affection of this viscus, he says, is far from being correct. He has known many individuals, who suffered a few very severe but short attacks of it, and then had no further return of it. On the other hand, he admits, that it frequently accompanies organic diseases of the heart. He has examined several subjects, whose cases were attended either with hypertrophy, or dilatation of the heart; but in none of these instances were the coronary arteries ossified. Andral relates a case, in which, after death, no appreciable morbid change was detected in the heart, but there were tubercles in the lungs. He takes the opportunity to observe, that the suspicion of *angina pectoris* being dependent upon an ossified state of the coronary arteries, is destitute of proof; and the disorder is set down by him as an impairment of, what he calls, the *innervation* of the heart.* Laennec conceives, that the site of the disorder may vary. When there is pain both in the heart and lungs, the affection may be chiefly situated in the pneumo-gastric nerve; when there is merely a sense of stricture in the heart, the disorder may be in the nervous filaments, which the heart receives from the great sympathetic nerve. Other nerves are also simultaneously affected by sympathy, or direct anastomosis.†]

When the real nature of the disease is thus doubtful, and its causes thus obscure or variable, its best mode of treatment must be equally uncertain; and though I willingly join with Dr. Heberden in thinking, that we ought not to despair of finding a cure, I am afraid we have not yet found it.

Where the temperament is plethoric, or the heart is evidently implicated in the affection, bleeding will often afford some relief. But, in the simplest cases of the complaint, where the pulse is little disturbed, and the heart without palpitation, the use of the lancet has proved injurious, rather than beneficial; and purging has been of as little avail. Antispasmodics and cordials, and especially wine, palliate the symptoms for a few minutes, but afterwards lose their virtue.

The mode of treatment which I have found most successful consists in putting the patient immediately in an inclined, rather than a recumbent, position, with his head raised high. He should instantly take an emetic of whatever may be given most

GEN. VI.
SPEC. I.
Sternalgia
ambulantium.

Affection of the
respiratory
muscles prior
to that of the
heart.

Views of the
nature of the
disease by
Laennec and
Andral.

Mode of treat-
ment doubtful.

Venesection
useful in cer-
tain cases only.

Cordials and
antispasmodics
only palliate.

Recumbent
position.

Emetics.

* Andral, Précis d'Anat. Pathol., tom. ii. p. 345.

† See Laennec on Diseases of the Chest, &c. 2d ed. p. 690.

GEN. VI.
SPEC. I.
Sternalgia
ambulantium.
Diaphoresis.

Opium.

Black drop.

Intervals may
be employed to
most advantage.

Chronic pre-
disposing
causes to be
combated.

Tonics.

Arsenic.

Vicarious
discharges.

Setons and
issues.

expeditiously, though the antimonial preparations form the best medicine for this purpose, as producing a longer action. As soon as the patient rejects, he may be allowed a little warm water, administered to him sparingly. The diaphoresis, hereby induced, should be assisted by a moderate warmth of bedclothes, and particularly by placing the patient between blankets; and, if the constrictive pain or difficulty of respiration still outlast the sickness, opium, intermixed with ether, camphor, or other diffusible antispasmodics, should be employed pretty freely. And I may here observe, as a general rule, that, where the common forms of opium, as the extract, wine, or tincture, are found to affect the head, the Lancashire or Cheshire preparation of it, known by the name of *black drop*, which is a solution of this drug, in verjuice, with, apparently, some portion of rectified spirit, and, certainly, a liberal combination of aromatics, seems to have less tendency to excite nausea and headach afterwards: and, from its being nearly double the strength of the ordinary laudanum, may be used in a much smaller quantity. Mr. Batley's well-known form will also, in many cases, succeed as well.*

But it is in the intervals of the fits that medical skill and ingenuity are likely to be most efficacious. If we find the complaint connected, as it often is, with a morbid diathesis of any kind, as that of gout, with the sudden suppression of any habitual discharge, as that of the hemorrhoidal vessels, or a chronic affection of any other organ, as the heart, the stomach, or the liver, our attention must be immediately directed to what may thus prove a predisposing cause, which we must endeavour to palliate or remove, according to the nature of the cause we may be fortunate enough to detect. The bowels, in the mean time, must be kept gently open, and a freedom from relapse be secured at night for a week or a fortnight by an opiate pill, or the extract of henbane.

As the disease is greatly dependent upon a morbid mobility and weakness of the muscular fibres, either general or local, a tonic course of medicine and regimen should be instantly commenced, and unswervingly persevered in. The diet should be light; all flatulent foods and drinks be cautiously avoided; the hours be early, and the exercise indulged in be of the gentlest kind.

Arsenic, in small doses, is said to have been tried with advantage†; but I know nothing of its effects from my own practice; and should prefer the oxydes of many other metals, and particularly those of bismuth, copper, and iron, as more likely to afford a permanent and radical cure. Sir Gilbert Blane has briefly noted a case, in which the disease yielded to arsenic in combination with digitalis and mercury.‡

Where the complaint is strictly idiopathic and uncombined, it has often been found to give way to some local irritation or vicarious drain. A sudden flow of blood from the anus has completely removed it. An ichorous or serous discharge from the same organ has proved equally successful; as has also an obstinate gleet. And it is hence not to be wondered at, that setons or issues should have

* At the present time we should commonly prefer the acetate or muriate of morphia; preparations of opium freed from narcotine. — ED.

† Alexander, Med. Com. Edimb., vol. v. p. 99.

‡ Medico-Chir. Trans., vol. iv. p. 136.

been productive of equal service. The latter are to be preferred as the least troublesome; one should be opened in each thigh, and each incision should be large enough to contain two peas; which it would be better at first to make of the mezereon bark, as already recommended for the same purpose in asthma.

[The prussic or hydrocyanic acid, prepared according to Scheele's formula, and given during the paroxysm, has sometimes proved rapidly successful; and this, probably, from its power of augmenting action, while it diminishes irritability.

Laennec has a high opinion of the usefulness of magnetism, with leeches, blisters to the fore-part of the chest, the cherry-laurel infusion, digitalis, or the foetid gums; a mild regimen, and the warm or cold bath, according to the season of the year.*]

GEN. VI.
SPEC. I.
Sternalgia
ambulantium.

SPECIES II.

STERNALGIA CHRONICA.

CHRONIC BREAST-PANG.

THE PAROXYSMS LESS VIOLENT, BUT OF LONGER CONTINUANCE;
RECURRING FREQUENTLY WITH GREAT PALPITATION OF THE
HEART, EXCITED BY SLIGHT AND OFTEN UNKNOWN CAUSES,
AND NOT RELIEVED BY REST.

FROM the observations, which have been thrown out at some length in treating of ephialtes and asthma, it is not to be wondered at, that sternalgia should in many habits, where it has once taken a hold, be peculiarly disposed to recur when the body is recumbent, and particularly during sleep: nor even that, in some idiosyncrasies, it should, like the two complaints just alluded to, often originate in such a state of body.

If, however, the first attacks do not prove fatal, the disease is often apt to become chronic; and to exhibit the symptoms that characterise the present species. The attack is now not only more easily brought on, but requires a longer period of time for its removal. Rest, even if it commence during exercise, has little or no effect, and the paroxysm has at times been protracted not only for some hours, but even for several days, without remission, and occasionally with a considerable degree of danger through the whole period. Yet it has occasionally continued to harass and weaken the constitution, without actually destroying it, for twenty years; and, in a few instances, has been known to cease spontaneously. In this species of the disease, we meet with far more instances of palpitation of the heart and irregular pulse than in the preceding; and not unfrequently these catenating symptoms become more manifest and distressing as the disease becomes more inveterate; as though the morbid state of the heart or its appendages were a result of sternalgia, instead of sternalgia being a result of the

GEN. VI.
SPEC. II.
Originates
often during
sleep, and why.

Apt to become
chronic.

In which case
removed with
greater dif-
ficulty.

Morbid pulse
and palpitation
more frequent
in chronic
cases.

* See Laennec on Diseases of the Chest, 2d edit. p. 693.

GEN. VI.
SPEC. II.
Sternalgia
chronica.
Illustrated.

former. In Sir Gilbert Blane's valuable Table of Medical Cases occurring in his private practice, as contradistinguished from the diary of his public duty as physician to St. Thomas's Hospital, under the head of "Palpitation of the Heart and Angina Pectoris," we have the following remark:—"In one of these cases, there was an extreme distress of breathing for five years, and the pulse fluctuated from 20 to 32, never falling below the former, nor exceeding the latter. Nothing gave material relief. Leave was not obtained to open the body after death."* Dr. Fothergill, in like manner, asserts, not only that the pulse, in his practice, has been irregular and intermitting during the exacerbations, but that it has continued irregular, and even intermittent, when the patient has been free from pain and at rest.

Treatment.

Of the medical treatment and regimen, I have already spoken under the preceding species.

* Med.-Chir. Trans., vol. iv. p. 136. The late Mr. Robert Bligh, who was attended by Dr. Pinckard and the editor, was attacked in bed nearly every night, for some months previous to his death, with such pain about the heart, palpitations, and difficulty of respiration, that he was always obliged to get up immediately, and walk about, to prevent suffocation. His pulse was generally between 28 and 36, regular and strong, but with a vibratory motion in it. One afternoon he fell down dead. The editor examined his body, assisted by Mr. Hooper, of the London Road. The auriculo-ventricular opening of the left side of the heart, and the mitral valves, were much thickened. The lungs were healthy, with the exception of some adhesions to the inside of the chest. In the right bag of the pleura, about a pint of bloody serum was discovered. The liver was prodigiously enlarged, hardened, and of a dark purple ink colour. In the gall bladder there were about twenty calculi; and, in the left kidney, a good deal of gravel. Experience certainly does not at present justify the inference, that angina pectoris is a distinct disorder, depending upon any determinate series of morbid appearances; though, in opposition to the conclusion of Laennec and Andral, it may be safely asserted, that it is undoubtedly, in many instances, not simply a functional disorder of the nerves of the heart, but actually connected with organic disease, as exemplified by dissections. — Ed.

GENUS VII.

PLEURALGIA.

PAIN IN THE SIDE.

PUNGENT PAIN IN THE SIDE; DIFFICULTY OF BREATHING;
WITHOUT FEVER OR INFLAMMATION.

THE last genus of diseases which occurs under the present order, is that which has been usually denominated pleurodyne, for which pleuralgia is here adopted in its stead, for the sake of simplicity. Both terms import pain or ache in the side; but as *algia* is a more common medical termination than *odyne*, and one alone is sufficient, a preference has been given to the former. On a nice and critical examination, it would not be difficult to point out a shade of difference between *άλγος* and *όδύνη*, but no such critical distinction has been ever attended to by professional writers, and, as terminations to medical compounds, they are used convertibly, or as direct synonyms.*

GEN. VII.
Synonym.

The difficulty of breathing, noticed in the generic definition, depends altogether upon the acute ache produced by every attempt to inflate the lungs; and, though negative characters ought to be avoided as much as possible, both in generic and specific definitions, it is necessary in the present instance to add, "without fever or inflammation;" since this is the chief feature by which pleuralgia, or "stitch in the pleura," is distinguished from "pleuritis, or inflammation of the pleura."

Difficulty of
breathing on
what depend-
ent.

Pleuralgia, or pleurodyne, is no more to be found in Dr. Cullen's Nosology, than sternalgia. Pain in the side is, in his opinion, never any thing more than a mere symptom of some other complaint, most commonly rheumatism; and the example, which Dr. Cullen has thus set, has been followed by most of the later writers of our own country. There are two species, however, that have a fair claim to be regarded as strictly idiopathic. They do not often, indeed, constitute alarming diseases, but, so long as they continue, are peculiarly distressing; while the latter is often of long duration, and demands a considerable range of medical treatment.

Sauvages, therefore, is fully justified in forming a distinct genus of the complaints before us; and Macbride is more to be commended in following his example, than Cullen in departing from it. The two species are as follow:—

- | | |
|----------------------|---------------------------|
| 1. PLEURALGIA ACUTA. | STITCH. |
| 2. ————— CHRONICA. | CHRONIC PAIN IN THE SIDE. |

* See the Author's Preliminary Dissertation to his Nosology, p. lix.

SPECIES I.

PLEURALGIA ACUTA.

STITCH.

PAIN SUDDEN AND TEMPORARY: SUPERVENING ON MUSCULAR EXERCISE: RELIEVED BY PRESSURE.

GEN. VII.
SPEC. I.
Cause.

THIS species is found most frequent among boys, who are engaged in any violent exertion, and particularly in hard running. It is produced by too great and sudden a distention of the fine blood-vessels of the pleura, from undue propulsion of the blood.

How relieved.

It is relieved by a handkerchief, or any other tight bandage. It gradually subsides on rest, or even slackening the pace. When this is not the case, bleeding and other evacuants are instantly necessary; together with warm relaxing liniments, and anodyne fomentations.

Spasms, how distinguished from spasmus.

It is from this forcible distention of the minute vessels of the pleura that Van Swieten, Sauvages, and Macbride, distinguish this species by the name of pleurodyne à spasme; thus making a distinction between spasma and spasmus; and understanding, by the former, that voluntary stretching or straining which takes place in any vehement exertion, contraction, or extension of a muscle, as in striving, bearing heavy burdens, or running. In the language of M. de Sauvages, "*Spasma non est spasmus, sed distractio, divulsio, qualis accidere solet à vehementi musculi nisu, contractione, extensione; ut inter luctandum, onera gestanda, currendum.*"*

Found as a symptom in other diseases; in which, however, the exciting cause is different.

This species is occasionally met with as a symptom in flatulence, hysteria, and hypochondrias: in all these cases, however, though the disease or symptoms are the same, the exciting cause is very different. There is here, evidently, a nervous or irritable temperament, and a tendency to spastic action.

[With regard to the hypothesis of stitch depending upon an immoderate propulsion of the blood into the vessels of the pleura, it seems to be unsupported by any kind of evidence; nor is the editor aware, that mere distention of blood-vessels will in any other instance satisfactorily account for an attack of acute pain. The stitch, which is so common to young persons in their active sports, is generally a pain fixed nearly to a point either within one of the hypochondria, or under the false ribs, and is too circumscribed to admit of being explained by the supposed immoderate distention of the blood-vessels of the pleura, even if such distention could account for the sudden pain.]

* Nosol. Method., Cl. v. Ord. ii. Gen. xi.

SPECIES II.

PLEURALGIA CHRONICA.

CHRONIC PAIN IN THE SIDE.

PAIN PERMANENT: AUGMENTED BY PRESSURE: INABILITY OF LYING ON THE SIDE AFFECTED.

THIS species is more diffused than the first, and accompanied with a considerable degree of irritation; whence pressure, instead of diminishing, augments the pain. The cause is therefore of a different kind from any of those already noticed, and is perhaps most frequently to be found in adhesions of the folds of the pleura to each other, or to the intercostal muscles, or, a thickening in some part of its extent, whereby the play of the respiratory organs is impeded, and a state of perpetual irritation, or a ceaseless tendency to irritation, is kept up.

This species has also often been produced by a fractured rib, or some other lesion of the chest; or by some internal malformation, or other structural disease in the organs of the same cavity. Dr. Percival, in a note upon this species, appended to the volume of *Nosology*, refers to a case which once occurred to him, of pain in the left side, acute and obstinate, that baffled all remedies, local and general; and which was at length found to have originated from an aneurism of the aorta.

Chronic pleuralgia may also follow from an inflammation of the pleura; or from transferred gout or rheumatism. It is peculiarly apt to take place under every disease, which, by lowering the tone of the system, renders it generally irritable and subject to irregularity of action; as is the case in worms, syphilis, and phthisis. The opposite extreme of plethora has, moreover, not unfrequently been found to produce it.

Most of these, however, may be regarded as mere symptomatic affections. Among the genuine idiopathic cases may be mentioned, in the first place, those produced by external pressure, as habitually forcing the chest, in writing, against the hard edge of a desk; or, which still more frequently occurs, and is productive of far severer effects, by the absurd, though fashionable, use of tight stays, which, while they undermine the health, generally coop up and distort the chest into a shape equally ungraceful and unnatural. This barbarous custom cannot be too strongly inveighed against: for, though the imprisoned young female may, by dint of habit, and where little exercise or exertion is required, be able to obtain a sort of triumph over the primary mischief of adhesions hereby produced; yet may she pave the way for an obstinate cough, phthisis, and lateral curvature of the spine; and, should she escape these, she will still have other inconveniences to suffer as soon as she reaches a state of pregnancy.

In attempting either to cure or to palliate the present species of pleuralgia, we must direct our eye as nearly as possible to its cause.

GEN. VII.

SPEC. II.

Pressure augments the pain in this species. Common causes.

Produced by accidental injury, or morbid structure:

inflammation of the pleura, or transferred gout:

worms, syphilis or phthisis: sometimes plethora.

When strictly idiopathic.

Tight stays: their mischievous effects.

Treatment.

GEN. VII.

SPEC. II.

Pleuralgia
chronica.

Bleeding gene-
rally requisite ;
by the arm or
locally.

Dry cupping.

Loose dress.

Blistering.

Setons and
issues.

Electricity.

Internal
medicines.

If the affection be symptomatic, we must combat the original disease. If idiopathic, bleeding from the arm will generally be found requisite, and freely, if we suspect plethora ; but locally by cupping or leeches, if it be from the mischievous habit of dress we have just reprobated, and the constitution, as is mostly the case, be relaxed and delicate. Here also dry cupping has been frequently found serviceable. Under all circumstances, a loose dress should be insisted upon. Blistering will often afford relief, and the discharge should be rendered permanent ; but a seton or an issue will generally succeed better than a blister. Electricity, by drawing sparks, has also proved frequently of use. [Laennec's opinion of magnetism has been noticed under the first species, where the other remedies in which he confides are also briefly mentioned.] Quiet rather than exercise is demanded, and the ablest course of internal medicines will be that which is best calculated to take off irritating and irregular action, as bark, valerian, snake-root, conium, and the various preparations of the hop.

CLASS III.

CLASS III.

HÆMATICA.

DISEASES OF THE SANGUINEOUS FUNCTION.

ORDER I.

PYRECTICA.

FEVERS.

II.

PHLOGOTICA.

INFLAMMATIONS.

III.

EXANTHEMATICA.

ERUPTIVE FEVERS.

IV.

DYSTHETICA.

CACHEXIES.

CLASS III.

PHYSIOLOGICAL PROEM.

IN treating of the very important and extensive range of diseases, included under the present class, let us first take a brief survey of the sanguineous function, which is the immediate theatre of their operation, and the means and instruments by which it is maintained.

This comprehensive subject may be most conveniently discussed under the three following divisions:—

CL. III.
Proposed scope
of inquiry.

General divi-
sion.

I. THE MACHINERY OF THE SANGUINEOUS SYSTEM.

II. ITS MOVING POWERS.

III. THE NATURE OF THE FLUID CONVEYED.

I. Machinery
of the san-
guineous
system.

Unsatisfactory
hypotheses of
the ancients.

A circulation
loosely sus-
pected by the
ancients.

Proofs of the
circulation.

I. The importance of the blood to the general health of the animal system, and its existence in every part of almost every organ, have been known, in every country in which medicine has been studied, from the first dawn of its cultivation. It is not necessary to retrace the wild and idle hypotheses, that were started in ancient times to account for the means by which this universal fluid travels from one part to another, and appears in every quarter. It is enough to observe, that, till the great and transcendent doctrine of the circulation of the blood was completely established, the acutest physiologists wandered about in darkness and uncertainty, seldom satisfying themselves, and still more rarely the world around them.

The opinion, indeed, of a circulation of the blood through the system was loosely started by various writers even of very early times; but, under every modification, it was found to be accompanied with so many difficulties, as always to be dropped almost as soon as it was revived, and rarely, till the middle of the seventeenth century, to show itself to any effective purpose. Hippocrates guessed at it; Aristotle assented to it; Servetus, or Servede, who was burnt as a heretic in 1553, imperfectly taught it by pointing out the smaller circulation, or that through the lungs; and our own illustrious countryman, Harvey, about a century afterwards, gave a finish to the inquiry, by establishing the larger circulation, or that over the whole frame.

The principal proofs of a circulation of the blood offered by Harvey, and those, indeed, on which we chiefly rely in the present day, are deduced from the disposition of the valves at the origin of the two great arteries; from the mechanism of the valves in the veins; and from the arrangement of those of the heart; from the possibility of draining an animal of its blood by opening either an artery or a vein; from the range of the arteries and the veins, and from what occurs when either the arteries or veins are opened,

I. Machinery
of the san-
guineous
system.

Arteries gene-
rally terminate
in veins :

Many of them
in exhalants :

others perhaps
in lymphatics.

Instruments of
the sanguifer-
ous machinery.

Heat in the
more perfect
classes of ani-
mals.

compressed, tied, or injected. All the valvular contrivances, to which a reference has been made, prevent the blood from taking any other course, than what the present doctrine of the circulation inculcates. If we open an artery, the blood that jets from the puncture flows in a direction from the heart : and in a direction to the heart, if we open a vein. A compression or ligature upon an artery, puts a stop to the blood that flows from above the ligature ; but the same upon a vein puts a stop to the blood from below it, in which direction the vein immediately becomes distended. In like manner, an acid liquor, injected into the veins, coagulates the blood in the direction towards the heart, proving that the venous blood is every where travelling in this course. While an examination by the microscope of the vessels of the half-transparent textures of frogs, and other cold-blooded animals, confirms the view laid open by these phenomena, and shows to us a continual flow of the blood from the heart into the arteries, thence into the veins, and thence to the heart again ; thus completing the circular career.

The arteries, therefore, generally speaking, terminate in veins ; but by no means the whole of them, for many are exhalant or secretory, and terminate on the surface of membranes and other organs by minute orifices ; which no microscope, however, has yet discovered, but whose existence we have every reason to believe, as we perceive a perpetual oozing of fluids, whose flow we cannot otherwise account for, into all the cavities of the body ; which keeps their surfaces moist, and makes motion easy. While, according to M. Magendie, whose experiments, however, seem to want confirmation, other minute arteries terminate in lymphatics, which he makes as much a part of the sanguiferous system as the veins ; the lymphatics conveying the more attenuate part of the arterial blood, slightly tinged of an opaline or rose-coloured hue,* though sometimes of a madder-red ; such as the fluid which oozes upon puncturing the lymphatics, or the thoracic duct after a long fast. It is not necessary to examine into the correctness of this hypothesis in the present place, as we shall have occasion to notice it more at large when treating of the excernent system, which will be found to embrace both the absorbent and secretory vessels. It should be remarked, however, that, in M. Magendie's hypothesis, the veins, and not the lymphatics, are the absorbents of the body.*

Omitting, then, for the present, the consideration of the lymphatics, the machinery, by which the circulation of the blood is principally effected, consists of the heart itself, the arteries, and the veins.

The heart in the more perfect classes of animals, as mammals, birds, and most, though not all, amphibials, is a very compound organ ; for in all these the blood, when received from the veins, is first sent from this central organ to the lungs to be duly aerated, or, according to Mr. Ellis's hypothesis, to be unloaded of its excess of carbon, and is afterwards returned from the lungs to the same organ before its general circulation over the system commences. These classes, therefore, are said to possess a double circulation. And as the heart itself consists of four cavities, a pair, composing what is called an auricle and a ventricle, belonging to each of the two circulations ; and as each of these pairs is divided from the other

* Précis Elémentaire de Physiologie, tom. ii.

by a partition, these classes are also said to have not only a double circulation, but a double heart; a pulmonary and corporeal circulation, and a pulmonary and corporeal heart.

[The division of the circulation into two parts, the *great aortic*, *systemic*, or *corporeal*, and the *less*, or *pulmonary* one, has generally been adopted since the time of the illustrious Harvey. Bichat conceived, however, that a division, founded on another principle, was preferable for the purpose of illustrating the objects of the blood's motion. The blood in one portion of its course is remarkable for its bright scarlet hue; in another, for its dark colour. In the first, it is flowing from the lungs to all parts of the body; in the second, it is returning from these parts to the lungs. The first is Bichat's *circulation of red blood*; the second, his *circulation of black blood**; a distinction, that at once gives a prompt introduction to the knowledge of the purposes of the circulation.]

I. Machinery of the sanguineous system.

Heart double, and circulation double.

Circulations of red and black blood.

Seat and appendages of the heart.

The heart, in which the chief impelling power of the two vascular systems resides, is situated in the chest, between the lungs, and upon the diaphragm, by all the motions of which it is influenced. [The texture of the heart is fleshy, but very dense and compact, consisting of packets of fibres, more or less oblique, and variously contorted. The lesser ventricle, which has to propel the blood to a much greater distance than the right, is more fleshy and strong than the latter, which has merely to send the blood through the lesser or pulmonary circulation. When the chest and pericardium are opened in a living animal, the heart may be seen beating; the action of the auricles and ventricles alternating; that is to say, the two auricles contract together, and then the two ventricles. When the stethoscope is applied to the region of the heart, the distinct sounds of the action of the ventricles and auricles may be heard. At the instant when the pulse is perceptible in the arteries, a dull sound is audible, and directly afterwards a clearer sound, similar to the noise of a valve. The former arises from the action of the ventricles; the latter from that of the auricles.†]

* Bichat, Anat. Gén., tom. ii.

† See Laennec, *Traité de l'Auscultation*, &c. tom. ii. p. 403. edit. 2. Some experiments, made by Dr. Stokes and Mr. Hart, and of which an account is given in the *Edin. Med. and Surgical Journal* for October, 1830, p. 269., lead them to conclude, that Laennec was mistaken in his opinions respecting the impulse of the heart. "It is not, as he states, produced during the systole, but during the diastole of the ventricle. In point of fact, the pulse in the extremities, and the impulse of the heart, arise from one and the same cause; in the artery from its diastole, and, in the ventricular portion of the heart, from the same cause. This explains satisfactorily the want of coincidence between the impulse of the heart and the pulse at the wrist." (Op. cit., p. 271.) The observations of the same experimenters lead to the following results:—1. That, in a state of health, the impulse of the heart precedes that of the arteries. 2. That the interval between the impulse of the heart and the pulse in the arteries is in the direct ratio of the distance of the vessels from the centre of the circulation. 3. The pulsations of arteries in different parts, but at equal distances from the heart, are synchronous. 4. The greater the distance, the longer will be the interval. 5. That, although the actual pulsations depend on the systole of the left ventricle, yet the diastole of the vessels does not occur synchronously in all parts of the body, but is progressive. In the production of the sounds of the heart, as audible with the stethoscope, Dr. Stokes and Mr. Hart consider, that two causes are concerned. If, as they endeavour to show, Laennec's first sound, or that coinciding with the impulse, be produced during the diastole of the ventricle, it must be produced by this cause, and the contraction of the auricle. To the produc-

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of the sanguineous
system.

The blood is returned from the greater circulation by the two large venæ cavæ into the right auricle. At the same moment, it is poured into the left auricle from the pulmonary circulation by the four pulmonary veins. The auricles being thus filled with blood, contract, when the blood, partly thrown back into the veins, produces, by its reflux from the right auricle, a pulse, sometimes visible in the internal jugular veins of thin persons*, but the main part of it is propelled into the right ventricle. The auricles then become relaxed, and the ventricles act, and drive back into the auricles such blood as happens to be situated behind the tricuspid and mitral valves, the valves placed at the communications between the auricles and ventricles, while the rest is thrown by the right ventricle into the pulmonary artery, and by the left into the aorta. All regurgitation from these two great trunks is now impeded by the operation of the semilunar valves, placed at their commencement.]

Pericardium.

The heart is loosely surrounded by a dense and fibrous membrane, named, from its situation, pericardium, possessing little sensibility, closely connected with the diaphragm, and reflected over the heart and its large vessels. Physiologists commonly represent its use to be that of confining the heart in its proper post; and of lubricating it, in its state of unceasing activity, with a peculiar fluid, denominated liquor pericardii, secreted from the capillary arteries of its internal surface. In a state of health, this fluid is small in quantity and of a reddish hue, some portion of the red parts of the blood being intermixed with it; but, in a morbid state of the membrane, it is apt to accumulate, change its properties, and lay a foundation for various complaints.†

Heart not
much confined
by the pericar-
dium-

[With respect to the considerable effect imputed to the pericardium in regulating the motions of the heart, and preventing this organ from *leaping* out of its place, as the expression is, one or two facts, brought to light by dissection, have materially weakened, if not quite subverted, the hypothesis. A few instances have occurred of the heart being found without any pericardium whatever, or any device to answer its purpose. Dr. Baillie has recorded a singular instance of this in a man, aged about forty, who died of an accidental complaint, without seeming to have suffered from the deficiency.‡ Many examples are met with, where the bag of the pericardium and its reflected layer on the heart are completely adherent together, without any particular effect on the action of the latter viscus. A similar case to that in Dr. Baillie's works, is reported by M. Littré.§ The circumstances which have most influence in fixing this organ, are, its situation between the

tion of the second, on the other hand, attributed by Laennec to the contraction of the auricles, *the contraction of the auricles and the dilatation of the ventricles appear necessary.* With respect to the phrase *diastole of the vessels*, employed by Dr. Stokes and Mr. Hart, it would perhaps have been better to have substituted the term *pulsation*, as the experiments of Dr. Parry tend to prove, that there is no true dilatation or diastole in the arteries accompanying the pulse, as will be presently noticed.

* Magendie's Physiology by Milligan, p. 360.; and Mayo's Outlines, p. 67.

† See Bostock's Elem. System of Physiology, vol. i. p. 363. 8vo. 1824.

‡ See Baillie's Works by Wardrop, vol. i. p. 44.

§ Hist. de l'Acad. des Sciences, 1712, p. 37.

two lungs, which enclose it nearly on every side; and its connection with the large blood vessels.

When, as an able physiologist has observed, we take into consideration the relative importance of the heart and brain, as far as regards mere animal existence, we shall be led to decide in favour of the former. In incubation, as the immortal Harvey pointed out, a beating point, a "punctum saliens," as he expresses it, which is the rudiment of the future heart, precedes the formation of other parts of the body, and is visible for some time before any trace of the brain can be distinguished. Acephalous fœtuses have been known to attain their full size in the womb, and even to have lived for a short time after birth, and then died from not being able to effect those changes, which are incidentally necessary to an existence of any duration. For example, a regular supply of nutritious matter is essential to the support of life; this can only be supplied by the introduction of food into the stomach by the act of deglutition; but this act, at least in the higher animals, cannot be performed without the intervention of the nervous system.*

I. Machinery of the sanguineous system.

Its high importance.

The sides of arteries are divisible into several strata of dissimilar substances, technically named *coats* or *tunics*. Mascagni, like the older anatomists, who preceded him, represents both the arteries and veins as having four coats†; but, his external one (*ascitizia*) is merely the cellular membrane that connects the vessels to the adjoining parts.‡ According to Rudolphi, and the generality of modern anatomists, all vessels have at least two coats, and the arteries three. Some writers indeed reckon only two proper arterial coats, and describe every arterial tube, exceeding one line in diameter, as visibly composed of one adventitious and two essential substances.§ The three arterial coats are now generally called *external*, *middle*, and *internal*; denominations adopted by Dr. Jones in his excellent work on hemorrhage; or *elastic*, *muscular*, or *fibrous*, and *membranous*. By Bichat, the latter tunic was styled the *common membrane of the system of red blood*, as it is not restricted to the arteries, but extends over the inner surface of the left ventricle and auricle of the heart, and lines the pulmonary veins, and, in short, the whole track of the scarlet blood.

Structure of arteries.

In examining arteries, one of the first things observable is, that the sides of the large arteries are thick and elastic, so that, when these vessels are transversely divided, the section presents a regularly circular aperture.|| Elasticity is rather obscure in the greater number of the textures of the animal body, a more prevalent feature of which is softness; yet it is very conspicuous in the arteries, and one thing that particularly marks their difference from veins, keeping their sides apart, even when they are empty. In fact, the arteries and some cartilaginous passages, like the wind-pipe, and the meatus auditorius of the fœtus, are the only tubes which are sufficiently elastic to remain open of themselves. It is to the elasticity of the arterial parietes that must be ascribed the sudden return of their naturally pervious condition, after their

Great elasticity of arteries.

* See Bostock's Physiology, vol. i. p. 335.

† Prodromo, pp. 61—64.

‡ K. A. Rudolphi, Elem. of Physiol., vol. i. p. 90.

§ See Edinb. Med. Journ., vol. xviii. p. 258.

|| Haller, Elem. Physiol., tom. i. p. 37.

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of the sanguineous
system.

cavity has been momentarily effaced by compression, and the quickness with which an artery that has been bent straightens itself again. According to Bichat, this property is also manifestly concerned in the sort of locomotion, which the arteries undergo from the influx of blood into them. If a tortuous arterial trunk be exposed in a living animal, the whole of it will be seen to rise up at each pulsation, quit its place, and straighten itself. As soon as an anatomical injection is thrown into the vessels of a very thin, diminutive subject, a locomotion of all the tortuous branches of the face becomes perceptible through the integuments. If the arteries had not a firm, elastic texture, they could not thus yield to the impulse communicated to them. The abdominal branches of the vena portæ, having no valves, may be injected like the arteries; but nothing, resembling the above locomotion, is observable when the fluid is impelled into them. Bichat frequently made arterial blood circulate in veins by means of curved pipes adapted to the vessels of a living animal; for instance, to the carotid and external jugular vein; yet, though a kind of pulsation, synchronous with that of the heart,—an evident rustling,—could be felt in the veins, thus injected with arterial blood, no real locomotion was discernible.*

Internal coat
of arteries.

The *internal coat* of the arteries, though extremely thin, and even semitransparent, is very close in its texture, endued with little elasticity†, and gives to those vessels their smooth polished lining. It does not exhibit the dun yellow colour of the middle coat; nor has it any fibrous appearance, being every where perfectly level and slippery.‡ According to the experiments of Dr. Jones, it is elastic and firm *in the longitudinal direction*; but so *weak in the circular*, as to be very easily torn by a force applied in that direction.§ In the dead body, Bichat noticed, that it seemed to have an unctuous fluid upon it, which he conceived, however, might not be the case in the living subject. It is of folds of the internal coat of the arteries, that the semilunar and sigmoid valves are formed at the origins of the aorta and pulmonary artery, the important uses of which valves have been already cursorily stated. The same membrane also forms the various ridges at the commencement of the arterial branches. It is very feebly united to the middle coat; and, according to Bichat, there is no cellular tissue between them. The morbid changes, to which it is subject, prove its vascularity. Indeed, during life, it is particularly connected with arterial diseases. Thus its inner surface becomes the seat of adhesive inflammation, whenever the blood is prevented by a ligature from passing along it, or the opposite sides of the vessel are gently held in contact for a certain period. In elderly persons, it is also noted for its singular tendency to ossify. Bichat calculated, that, in every ten individuals past their sixtieth year, the arteries of at least seven have earthy incrustations on them. These ossifications, which never affect the middle coat, always begin upon the external surface of the inner coat, being lined by a thin pellicle, which intervenes between them and the circulating blood, and is

Ossification of
arteries.

* Bichat, Anat. Gén., tom. i. p. 289. † Hunter on the Blood, p. 117.

‡ Soemmerring, De Corporis Humani Fabricâ, tom. v. p. 57.

§ On the Process of Nature in suppressing Hemorrhage, &c. 8vo. Lond. 1805.

plainly the internal coat itself. These calcareous depositions in the arteries are not regulated by the laws of common ossification, the cartilaginous state rarely preceding them. The earthy matter is always deposited in detached plates, or scales, and the whole artery is seldom converted into one continued solid tube. Thus the portions of the internal coat, between the scales, was considered by Bichat as so many articular bands; the arteries thus ossified being composed of numerous pieces, moveable upon each other, and capable, in a certain degree, of yielding to the impulse of the circulation. While these earthy plates continue thin, the inside of the artery retains its natural smoothness; but, when they acquire thickness, they project into the cavity of the vessel; the thin pellicle breaks at their circumference; and they then adhere merely to the fibrous coat.

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The *middle coat*, which is the thickest, consists of several layers of firm, compact fibres, considered by Hunter, Jones, and many other physiologists, as *fleshy* or *muscular*. It is sometimes called the *fibrous coat*, and often the *muscular*. Bichat names it *the proper membrane of an artery*, and observes, that it is very apparent in the large arteries, but less perceptible in their ramifications, where it is gradually lost.* Its fibres have a circular direction; being, however, rather obliquely connected, and interlaced with each other, than complete circles. According to Jones, they are of a peculiar nature, well supplied with nerves, and in form and disposition like muscular fibres, but different from them in possessing a remarkable degree of elasticity. They also differ from muscular fibres in being of a yellowish dun colour; in not having the same taste when boiled†; and in having no fibrine as one of their constituent parts. With respect to the colour of muscular fibres, a red colour is peculiar only to those of vertebrated animals, and, even in amphibia, they appear very pale, and, in numerous fishes, still paler. Many of the lower animals, as, for instance, the actiniae, possess a manifest power of contraction; yet, as Dr. Bostock observes, their substance is quite as unlike that of the muscles of warm-blooded animals, as the transverse fibres of the arteries are alledged to be.‡ The non-muscularity of the middle coat of an artery, therefore, must not be inferred from the mere circumstance of its not corresponding in colour to the muscles of the human body.

Middle coat of arteries.

Such physiologists as consider the middle coat of the arteries to be muscular, amongst whom are Haller, Walther, Hunter, and Soemmerring, build their opinions upon various grounds, some of the firmest of which were explored by Mr. Hunter. It is also argued, that the fibres become soft and greyish in the small arteries, and assume much of the appearance of those in the intestines; that, notwithstanding the dryness, resistance, elasticity, and fragility of the arterial fibres, not more difference really exists between

Whether it is muscular.

* Anat. Génér., tom. i. p. 270. Yet, according to Hunter's experiments, the smaller the arteries are, the more contractile and muscular they become in relation to their size; while, comparatively speaking, the proportion of elastic matter is most abundant in the great arteries. — ED.

† Rudolphi's Elements, vol. i. p. 80.; J. J. Berzelius, Animal Chemistry, p. 25.

‡ Elem. Syst. of Physiol., vol. i. p. 399.

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system.

them and the muscular fibres, than between those of different muscles; and that the muscularity of arteries is proved by their functions. With such statements Bécclard joins another, which disagrees with the researches of Berzelius; namely, that he has detected a proportion of fibrine in the middle coat of the arteries.*

Dr. Jones represents the elasticity of an artery as so particularly inherent in the middle coat, that, if this coat were separated from the two others, it would retain its cylindrical form, while they would collapse. This statement is certainly not applicable to the largest arteries, the outer coat of which possesses very considerable elasticity, and perhaps even a greater degree of it than the middle one.

External coat
of arteries.

The *external coat* of the arteries is often described as condensed cellular membrane. Its texture towards the middle coat is close and smooth, but, more externally, it is open and rough, in consequence of the cellular substance by which it is connected to an additional covering named the arterial sheath. The external coat is remarkable for its density, whiteness, and great elasticity. If an artery be surrounded with a tight ligature, the middle and internal coats will be completely divided, while the external coat will remain entire. Hence, the strength of an artery must depend in a great measure upon this coat, and its importance may be conceived from the fact, that it encloses and transmits the vasa vasorum, by which the artery itself is nourished.

Cellular sheath
of arteries.

The sheath of arteries is merely the lamellated cellular substance that forms around them a sort of canal. On one side, it is connected to their external coat by numerous filaments of cellular membrane; while, on the other, it is continuous with the common cellular substance. It does not exist where arteries are covered by serous membranes. Other arteries are likewise destitute of it, apparently in consequence of their being no cellular membrane in their vicinity, as in the brain. In the limbs, it is generally very compact; but, in some other situations, it is quite lax, as around the spermatic arteries.†

Little or no cellular
substance
in arteries.

According to Bichat, although the cellular tissue forms the external coat of the arteries, and serves for the insertion of the arterial fibres, it is not continued into their interstices; a peculiarity, he says, in which the arterial tissue differs from that of muscles, veins, &c. This absence of cellular tissue he also remarked between the middle and internal coats; though the observation disagrees with the statements of Haller, Soemmerring, and others.

* Bécclard, *Additions à l'Anat. Gén.*, p. 78. According to Cuvier, the middle coat of the arteries, which is fibrous in man and the horse, is decidedly muscular in the elephant. Dr. Wedemeyer, summing up all the objections made to the doctrine of the muscularity of the arteries, states, that, whereas the true muscular fibre is reddish, soft, extensible during life, and very brittle after death, the fibrous coat of the arteries is, on the contrary, yellowish, firm, hard, and very elastic even after death; that its vasa vasorum do not distribute themselves as in the muscular fibre; that it does not contain any fibrine; that it is not excited to contract by galvanism, or any other irritant; and that, in its extreme liability to the deposition of calcareous matter between itself and the inner serous coat, it shows its resemblance to white fibrous tissue in other parts of the body, as well as its difference from true muscular tissue, between which and serous membranes calcareous matter is rarely secreted. See *Untersuchungen über den Kreislauf des Bluts*, &c. Hannover, 1828.—ED.

† See Bécclard, *Additions à l'Anat. Gén.*, p. 79.

It is to the want of cellular substance in the proper arterial tissue, that Bichat refers a great deal of the fragility by which it is characterised; the difficulty of arterial dilatations; the freedom of arteries from fat, anasarca, hydatids, cysts, and various tumours, to which the cellular membrane is liable.*

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Arteries are furnished with minute arteries and veins of their own, technically named *vasa vasorum*, and without the agency of which the nutrition, growth, and morbid states of the arterial system would defy all rational explanation. These small nutrient arteries originate from the neighbouring ramifications, and not from the artery itself, to which they are distributed. One exception to this arrangement is pointed out by Bichat: the aorta, at its commencement, gives off the coronary arteries, which, besides supplying the heart, ramify on that great vessel.

Vasa vasorum.

Absorbent vessels are very manifest around the large arteries, for instance, the crural. The enlargement of the cavities of arteries, as the body, limbs, and other parts, increase in size, implies the continual performance of absorption in the arterial structure. Other powerful arguments, in support of this inference, may be drawn from various pathological facts, especially from the liability of arteries to ulceration.

Absorbents of arteries.

According to Soemmerring†, all the arteries have nerves, which also appear to him to be smaller and fewer in the large trunks than in the branches of middling diameter. Hence, he concludes that the more minute arteries are, the greater is their proportion of nerve, in relation to their size. He states, that the vertebral artery, and the large mesenteric branches, in thin subjects, can be seen, without any difficult preparation, surrounded by a beautiful network of nerves. Lucae asserts that he has followed the nerves even into the substance of arteries. The late Mr. Wilson also succeeded in tracing filaments of nerves into the arterial coats. "I can have no doubt," he remarks, "of nervous filaments communicating with the packets of muscular fibres, as there is sufficient proof, in the action of blushing, that these fibres are much influenced by emotions of the mind."‡ The heart and larger arteries receive but few nerves directly from the cerebro-spinal portion of the nervous system, their nerves being principally supplied by the ganglionic system of the great sympathetic, which appears to have the organic, or nutritive, functions of life more especially under its influence. The two divisions of the nervous system are, however, intimately connected by the numerous branches which the great sympathetic receives from the spinal marrow, and by a few smaller branches coming from the brain. In an experiment made by Sir Everard Home, the great sympathetic nerve was irritated in the necks of dogs and rabbits, and a temporary increase of pulsation is said to have been thereby produced in the carotid arteries.§ In experiments of this kind, the physiologist should be careful not to confound the general disturbance of the circulation from the pain and agitation, with a local augmentation of the pulse of a particular artery from the effect of the irritation of the nerve, or nerves, by which it is supposed to be influenced.

Nerves.

* See Anat. Gén., tom. i. pp. 285—287.

† De Corporis Humani Fabricâ, tom. v. p. 59.

‡ On the Vascular System, p. 155.

§ Phil. Trans., 1814.

I. Machinery
of the san-
guineous
system.
Structure of
veins.

Have no cir-
cular fibres.

Their thickness
and strength as
compared with
arteries.

Their lining
never ossifies.

Their valves.

The veins are membranous tubes, like the arteries, but differ from these vessels in having a thinner and less fibrous texture, and in being often furnished with valves, which, in the arterial system, are nowhere found, except at the roots of the aorta and pulmonary artery. The veins are nearly destitute of that texture which is seen in the middle coat of the arteries, and are consequently to be regarded as little more than simply elastic tubes. As Soemmerring remarks, it is only in the large trunks of the veins, that any fibrous appearance can be traced.* Their office is to return the blood to the heart, after it has served the purposes for which it was sent from the two ventricles of that organ. Their action, is, therefore, entirely mechanical, and the blood is transmitted by them (as far, at least, as they themselves are concerned) upon hydraulic principles.† That the large veins have longitudinal fibres is generally admitted; but the transverse or circular ones ascribed to them by Marx‡ seem to Rudolphi to be nothing more than cellular membrane. He has never seen distinct circular fibres in the veins of the human subject, nor even a single one in the vena cava of a horse. § The force with which the veins resist any power tending to tear them, is much greater than might be expected from their apparent tenuity. Their area is much larger in proportion to their sides than that of the arteries; and, according to the experiments and calculations of Wintringham, the proportion, which the thickness of the arterial coats bears to that of the venous tunics, is in the largest trunks as fifteen to one. The veins also bear greater distention than the arteries without bursting. In Wintringham's experiments, the vena cava inferior sustained a column of water weighing 176lbs., while the aorta, in the same situation, was burst by a column of 158lbs. 11oz. The iliac vein was to the artery in this respect as 1034 to 1000. But, in the vessels of the viscera, the arteries exceeded the veins, and, in an old dog, the aorta was stronger than the vena cava. In the living subject, however, the veins are found more liable to dilatation and rupture than the arteries. They yield more readily, and admit of greater dilatation. The inner coat or lining of veins is thinner, more dilatable, and less brittle, than that of arteries. Ossification never takes place in it; and, as all what Bichat calls the *common* membrane of the black blood is of the same nature, the tricuspidal valve, with the semilunar or sigmoid valve of the pulmonary artery, and the lining of that vessel, never exhibit bony deposits, which are so common in the corresponding parts of the system of red blood.

The valves of the veins are produced by folds of the internal coat. In the larger trunks they are generally arranged in pairs, as at the entrance of the internal jugular into the subclavian, in the large veins of the leg and arm, and the vena azygos. Three valves situated together are sometimes observed, but not frequently. Solitary valves are frequently seen in the smaller veins. The size of the valves is proportioned to that of the vessel, but they are not always large enough to close it completely. The valves are chiefly found in veins which have a perpendicular position, as in the limbs,

* De Corp. Hum. Fabricâ, vol. v. p. 328.

† See Bostock's Elem. Syst. of Physiol., vol. ii. p. 403.

‡ Diatribe de Structura atque Vita Venarum. Carlsr. 1819.

§ Elem. of Physiol., vol. i. p. 90.

penis, testicle, neck, and the vena azygos. They are particularly numerous in the limbs and cutaneous veins, and very scarce in the viscera. There are no valves from the right auricle down to the iliac veins; none in the hepatic, renal, uterine, umbilical, cerebral, or coronary veins, excepting the single one at the mouth of the coronary in the auricle itself. According to Haller, there are none in the small veins generally, the diameter of which is less than one line. The valves begin in the iliac veins, where, however, they are not numerous; and they are found in such branches of the hypogastric veins as do not come from the uterus and bladder. The effect of the valves in compelling the blood to run in one direction in the veins is manifest. They lie close to the side of the vessel, and make no resistance to the blood's natural course; but, when that fluid is repelled in the vein, it lifts up the loose edge, and causes the margins of the two valves to form a partition in the cavity of the vessel. Hence the blood cannot retreat farther than the situation of the first pair of valves; consequently, any portion of a venous trunk has to sustain only the quantity of blood, contained between the two valves which bound it. Had it not been for this arrangement, the whole column of venous blood, when its return to the auricle was impeded, would have pressed on the minute veins with a degree of force which the coats of these vessels could not have resisted. The necessity of such a structure arises out of the comparatively slow motion of the venous blood, the absence of an impelling agent at the commencement of the venous circulation, and the degree in which it is influenced by the force of gravitation. In consequence of the valves, all pressure must have the effect of sending the blood on towards the heart. For the same reason, the swell of the muscles, when they act, must promote the venous circulation.

The coats of veins are furnished with minute arteries and veins, not essentially different from the nutrient vessels of the arteries. Their exhalants and absorbents are calculated to be few; and their supply of nerves much inferior to what the arteries possess.

The following are some of the considerations, which led Mr. Hunter to believe the arteries muscular, as well as elastic. When the inside of the arteries and veins of the alligator and turtle is inspected, he says, fasciculi of muscular fibres can be plainly seen.* But, in order to prove the point, he had recourse to experiments, in which he contrasted the action of the arteries with that of simple elastic substances. "Action in an elastic body," he observes, "can only be produced by a mechanical power; but muscles, acting upon another principle, can act quickly or slowly, much or little, according to the stimulus applied; though all muscles do not act alike in this respect. If an artery is cut through, or laid bare, it will be found that it contracts by degrees, till its whole cavity is closed; but, if it be allowed to remain in this contracted state till after the death of the animal, and be then dilated beyond the state of rest of elastic substances, it will only contract to the degree of that state. This it will do immediately; but *the contraction will not be equal to that of which it was capable while alive.*"

"The posterior tibial artery of a dog being laid bare, and its size attended to, it was observed to be so much contracted in a short

I. Machinery of the sanguineous system. Certain veins without valves.

Use of the valves.

Nutrient vessels and nerves of veins.

Hunter's arguments in proof of the muscularity of arteries.

I. Machinery
of the sanguineous
system.

time, as almost to prevent the blood from passing through it, and, when divided, the blood only oozed from the orifice.

"On laying bare the carotid and crural arteries, and observing what took place in them, while the animal was allowed to bleed to death, these arteries very evidently became smaller and smaller.

"When the various uses of the arteries are considered; such as their forming different parts of the body from the blood; their performing the different secretions; their allowing at one time the blood to pass readily into the smaller branches, as in blushing, and at another preventing it altogether, as in paleness from fear; and if to these circumstances we add the power of producing a diseased increase of any or of every part of the body; we cannot but conclude, that they are possessed of muscular powers."

Large arteries
most elastic;
small, most
muscular.

Certain experiments, to which Mr. Hunter had recourse, led him to infer, that the large arteries are most elastic, and the small ones most muscular. He injected the uterus of a cow, after it had been separated from the animal more than twenty-four hours, and he allowed it to stand another day, at the end of which the larger vessels had become much more turgid than they were when first injected; and the smaller arteries, he says, had contracted so as to force the injection back into the larger. He regarded this as a proof, that the muscular power of the small arteries is superior to that of the large ones, and that they retain it longer after their detachment from the rest of the system. The latter character is one, that Mr. Hunter particularly ascribed to all the involuntary muscles, to which class the arterial fibres belong.*]

Arterial structure.

Nothing can differ more widely than the relative spissitude and power ascribed to the elastic and muscular arterial coats, compared with each other in different parts of the circulating course. As the heart is the salient point of the circulation, and pours forth about two ounces of blood at every jet, the greatest force is exerted against the arteries that immediately issue from the heart. Here, therefore, we find the greatest resisting power; for, in the aorta and pulmonary artery, the elastic tunic is stronger than the muscular, by which contrivance these vessels are never too much dilated by the action of the heart in its contraction, or, as the Greeks call it, systole. In like manner, this tunic becomes stronger at the bending of the joints, and continues so through the whole length of the curve; and the same provision takes place at the sharp angles made by a trunk and its branch, or at an angle formed by the division of one trunk into two. As the arteries, however, recede from the heart, the blood, resisted at every step by the elastic tunic of the canal it flows through, progressively loses its impetus, and a less elastic power becomes necessary and is actually provided. At a considerable distance, therefore, from the heart, in whatever direction the arteries ramify, their muscular tunic soon balances their elastic, and gradually becomes superior; till at length, in the capillary arteries, it is nearly, if not altogether, the only tunic of which the canal consists: whence the ease, with which these vessels collapse on some occasions, as from loss of blood, or the exercise of terror, or any other depressing passion; and the

Skilful adjustment of the arterial and muscular tunics.

Cause of collapse on loss of blood.
Cause of blushing.

* Op. cit., p.115.

equal facility with which they open in other cases, as in the sudden blush of shame or modesty.

[Many of the phenomena, which Mr. Hunter and other distinguished physiologists refer to the muscularity of the arterial system, Bichat ascribes to a property which he terms contractility of tissue, that is to say, a property depending upon organization, and not upon life. He takes a view of such contractility as operating in the transverse and longitudinal directions. In the former it is much more strongly marked, than extensibility. He observes, that as soon as an artery ceases to be distended with blood, it evidently shrinks. Hence: 1. The conversion of the umbilical artery and ductus arteriosus, after birth, into ligamentous impervious substances. 2. The obliteration of an artery all the way from the place of a ligature to the point at which the first collateral branch goes off. 3. The diminution of the calibre of an artery between two ligatures, as soon as the blood between them is discharged by a puncture. 4. In experiments upon dogs, into which blood was transfused, with the view of causing an artificial plethora, Bichat found that the diameter of the arteries was nearly double what it was in dogs of the same size, after profuse hemorrhage. The same difference, he says, may be noticed in two animals of equal size, when one has been killed by hemorrhage and the other by asphyxia. 5. These experiments left no doubt in Bichat's mind of the fulness and smallness of the pulse, an artery being really more or less bulky according to the quantity of blood which it contains.* There is a limit, however, beyond which the vessel cannot be extended; but, from a deficiency of blood, it may contract to such a degree as to represent as it were but a thread.]

I. Machinery of the sanguineous system.

Bichat's contractility of tissue.

Different degree of contraction in different arteries.

Mr. Hunter calculated the degree of contraction that takes place in the different arteries of an animal bled to death. He subjected to very careful admeasurement the arteries of a horse killed in this manner, and whose muscles had all been allowed to contract equally, whence "we might reasonably presume that the vessels, at least such of them as were furnished with muscles, would also be contracted, the stimulus of death acting equally upon muscles in every form and every situation." He removed from the carcase sections of the aorta, iliac, axillary, carotid, crural, humeral, and radial arteries, with the precaution of not altering in the least their texture, or state of contraction. He measured them when slit open, so as to learn their greatest degree of contraction. He then stretched them transversely, and measured them when elongated as much as possible. Lastly, he measured them a third time, in the state to which they recovered by their own powers. He found that the power of recovering was greatest near the heart, and gradually diminished towards the extremities of the body. This was owing, as Mr. Hunter supposed, to the extension having entirely destroyed the power of muscular contraction, which is comparatively greatest in the small arteries, while the degree of contraction, which actually took place after such extension, proceeded from elasticity, which is most abundant in the larger trunks.

Here what Mr. Hunter imputes partly to muscularity, and partly

* See also Hunter, *op. cit.* p. 124.

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Arteries have no muscular power in the longitudinal direction.

Their elasticity greatest in the longitudinal direction.

Are arteries endued with sensibility?

Animal contractility.

to elasticity, Bichat would refer to contractility of tissue. The latter is of opinion, that most physiologists have confounded this kind of contractility in the arteries with irritability, the difference of which is shown by its always ceasing a few hours after death, whereas the contractility, spoken of by Bichat, takes place after death, though in a less marked degree.

Mr. Hunter, who, as we have seen, refers all contractility of the arteries to muscularity and elasticity, relates some experiments, the tendency of which is to prove that they have no muscular power of contraction in the longitudinal direction. In the first experiment, a longitudinal section of the aorta ascendens, measuring two inches, after having been stretched and allowed to contract again, measured the same length. The same thing was observed in portions of the carotid and humeral arteries. "These experiments," Mr. Hunter says, "appear to be decisive, and prove, that *the muscular power acts chiefly in the transverse direction*; yet, it is to be observed, that *the elastic power of arteries is greater in the longitudinal than the transverse direction*." This appears to be intended to counteract the lengthening effect of the heart, as well as that arising from the action of the muscular coat; for the transverse contraction of that coat lengthens the artery, and therefore stretches the elastic, which again contracts upon the diastole of the artery."*

Many of Mr. Hunter's observations embrace the subjects of the vital properties of the arteries; as, for instance, whenever he reasons about the disputed question of their muscularity. Bichat, after considering the elasticity, extensibility, and contractility of tissue, or the properties, which he believed to depend on the structure or organization of arteries, offers some interesting reflections on their *vital properties*. First, he inquires, whether *animal sensibility* exists in them? The application of a ligature to an artery, he says, sometimes produces pain; but more frequently not. The latter statement the editor deems incorrect, or, at least, repugnant to what he has noticed in the practice of surgery. Nor can Bichat's observation be reconciled with what he presently says about the great sensibility of the inner coat of the arteries. However, as he admits, that they sometimes give pain when tied, this affirmative proof of their sensibility is all that can be required. He states, that, in whatever manner the carotid of a dog be irritated, whether with a scalpel, acids, alkalies, &c. the animal never betrays signs of pain. With regard to the inner coat, however, he found, that, although the injection of a mild fluid, like water, at the temperature of the animal, caused no uneasiness, the injection of a stimulating fluid like ink, diluted acids, wine, &c. excites very acute pain.†

Animal contractility, as Bichat terms it, or (as it might be expressed) contractility under the influence of the brain, and resembling that of the voluntary muscles, is stated by this author not to belong to the arteries. Such contractility, he asserts, could only depend upon a connection between these vessels and the brain; yet irritation of this organ, producing convulsions of parts subject to the will, has no effect upon the arteries; and opium, which, in a certain dose, paralyzes those parts, leaves the vessels unaffected.

* Hunter on the Blood, p. 128.

† Anat. Gén., tom. i. p. 295.

Another assertion made by Bichat, is, that, if the spinal marrow be exposed, irritated, and compressed, the action of the arteries is neither increased nor diminished, even though the voluntary muscles be at the same time convulsed or paralyzed from it. On the other hand, the experiments of Dr. Philip contradict Bichat on this interesting point, and show, that the motion of the blood in the capillaries is influenced by stimulants, applied to the central parts of the nervous system; which circumstance, if established as a fact, must depend upon the contractile power of those vessels.* In direct opposition to the result of Sir Everard Home's experiment, already mentioned, Bichat found the arteries to be quite unaffected, either by irritation of the cerebral nerves, which accompany them, or by that of the ganglionic nerves, which are irregularly and abundantly distributed upon their external surface. He even tried galvanism, without any effect.

I. Machinery of the sanguineous system.

The same physiologist represents the arterial system as destitute of what he calls *organic sensible contractility*, or that kind of contractility which, in his system, is classed as one of the properties of organic life, and illustrated in the action of the heart, intestines, &c. In whatever manner an artery be irritated in the living body, he asserts that it constantly remains motionless. Even when the arterial coats are stripped off layer by layer, either in a living animal, or one recently killed, none of that trembling and palpitation is perceived, which occur in the fibres of organic muscles under similar circumstances. The conclusion, to which Bichat's experiments lead him, is, that during life *the arteries have no contraction that is under the vital influence*, and he refers all the circumstances, usually brought forward to prove the contrary, to contractility of tissue. Thus, he observes, when an artery is tied at two points, and opened in the interspace, it empties itself of the blood contained in it, as well as of any other fluid accidentally placed in it. The same thing also occurs, when only one ligature is so applied, that it intercepts the influence of the heart. The dependence of these circumstances upon contractility of tissue, he argues, is so much the fact, that, as long as the artery is free from putridity, they take place in the dead subject. If an artery be filled, and then opened, it empties itself by contracting. The contraction, produced by defect of extension, is what Bichat regarded as a test of contractility of tissue; irritability, or organic sensible contractility, always implies the operation of a stimulus.

Organic sensible contractility.

Bichat describes *organic insensible contractility*, or *tonicity*, as plainly existing in arteries. In those, which pulsate, he says, it is restricted to the purposes of nutrition; but, as soon as the influence of the heart on the motion of the blood ceases, which (according to his theory) is probably at the beginning of the capillary system, then the organic insensible contractility begins to have effect, not only upon the nutrition of the coats of the vessels, but also upon the circulation within them. Indeed, in this physiologist's views, the circulation in the small vessels is altogether maintained by their tonic power, the heart having absolutely no concern with it.

Organic insensible contractility.

Bichat represents the arteries as endued with *organic sensibility*, which he says is never separated from the organic insensible con-

* Exp. Inquiries, &c. p. 291, 292. 2d edit.

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system.

tractility. In the large trunks, however, where it is only necessary for their nutrition, it prevails in a very obscure degree. It is by the organic insensible contractility, and the organic sensibility, that Bichat would solve many of the difficulties attending the comprehension of the process of secretion. What Mr. Hunter and numerous modern physiologists would ascribe to the action of vessels, Bichat refers to those two rather imaginary properties of the minute arteries. The difference seems, after all, to consist rather in words than meaning.

The following is a summary of the principal arguments, respecting the muscularity of arteries : —

Muscularity
of arteries.

1. When arteries are stimulated in living animals with a sharp instrument*, strong acids†, or electricity‡, the portion of the vessels so stimulated is declared by the subjoined experimenters to contract. On the other hand, the contraction of an artery on its being pricked, variously stimulated, or even galvanized, is positively denied by Bichat§, who ascribes the change produced by acids to a kind of crispation, attended with chemical injury of structure, whereby the vessel is for ever prevented from resuming its pristine diameter, which it would do, if the contraction depended on mere stimulation. But, in opposition to him, we have again the galvanic experiments of Giulio and Rossi, and that of Sir E. Home, who, as we have noticed, produced violent throbbing in the carotid by applying alkali to the great sympathetic nerve.||

2. Arteries are said to be capable of a peristaltic motion. The editor is not acquainted with the facts on which Soemmerring¶

* Verschuir, *De Arter. et Venarum Vi Irritabili*, p. 17.

† Zimmermann, *De Irritabilitate*, p. 24. Larry, in *Vandermonde's Journ.*, tom. vi. p. 7. Verschuir, *op. cit.* p. 19.

‡ Birker, *De Nat. Hum.*, p. 45. *Lugd. Bat.*

§ Wedemeyer's experiments support the doctrine of Haller and Bichat, that the greater arteries do not possess irritability, or vital contractility. With a battery of fifty pairs of plates, Wedemeyer galvanized the carotid artery, and the thoracic and abdominal aorta, sometimes during life, sometimes immediately after death, caused in various modes, and the artery was sometimes left in connection with the heart, and sometimes removed from the body; but its result was always the same: he never could remark any contraction. Neither could he excite any contraction with mechanical stimulants. Wedemeyer could not perceive that galvanism produced any contraction of the arteries of the umbilical cord and placenta, as asserted by Osiander. The apparent contraction of the aorta under electricity, he says, is nothing else than increased pulsation, arising from the action of the electric fluid on the heart, which is excited to increased action. Oesterrheicher has observed in fishes alternate contraction and dilatation of the bronchial artery. Wedemeyer has made the same observation; but says that this may easily be accounted for, because, near the origin of the vessel at the heart, distinct muscular fibres may be traced, not at all like the hard fibrous coat of the arteries in general. The same structure, he says, is particularly conspicuous in the torpedo. On the other hand, Cuvier's statement, that the fibrous coat of the arteries in the elephant is plainly muscular; and Béclard's, that the same tissue in the arteries of the human subject actually contains fibrine; must not be forgotten in forming a judgment on this contested point.

|| Oesterrheicher explains this fact on a different principle: if a nerve, supplying any vessel, be divided, and then stimulated at the end farthest from the brain, the artery does not pulsate with greater force; and hence, if its pulsation is increased, when the nerve is not previously divided, this arises from nothing else than the increased action of the heart, caused by the pain inflicted on the animal. — *Ed.*

¶ *De Corp. Hum. Fabricâ*, tom. v. p. 66.

finds this statement; unless it refer to Dr. Whytt's exploded hypothesis of an oscillation in the minute vessels.

3. The doctrine of the contractile power of the capillaries has received important corroboration from the experiments of Drs. Wilson Philip, Thomson, and Hastings. These gentlemen placed the web of a frog's foot in the microscope, and distinctly saw the capillaries contract upon the application of such stimulants as cause the contraction of the muscular fibre. Dr. Hastings found, also, the large arterial trunks, and even the veins, contract, as Verschuir and others had previously noticed. Dr. Thomson has seen the arteries contract in such a degree, on the application of ammonia, that their cavity appeared to be quite effaced. On the contrary, the muriate of soda always caused a dilatation of them.*

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system.

4. Arteries are alleged to pulsate very differently in different parts. With reference to strength and fulness of the vessels, the editor's own observations enable him to corroborate this fact; but he has never known an artery of one part of the body beat more slowly or quickly, than the rest of the arterial system. The occurrence, however, is mentioned by writers as a fact. An increased flow of blood to any particular organ, whether in health or disease, is inexplicable, unless some change in the diameter, or action, of the vessels supplying it, be taken into the account.

5. In one case upon record, the pulse of the arteries of a paralytic arm was quite indistinguishable; while, in the other arm, it was full and strong.† Here it is argued, that, if the pulse had depended upon the heart alone, it would have been as strong in the paralytic as in the healthy limb. Some highly instructive examples of the entire want of pulsation in the arteries of paralytic limbs are recorded by Dr. Storer‡, by whom, however, this effect is described as exceedingly uncommon.

6. Another argument is derived from the operation of local stimulants in producing inflammation. The lachrymal gland, when the eyes are irritated, or when it is itself affected through the mind, pours forth tears. The saliva is more copiously secreted from the effect of stimulating medicines, or of the sight and smell of victuals.

7. It is argued also, that, as the nerves of arteries are quite evident and abundant, these vessels must be connected with the brain, and be influenced by affections of the nervous system. Putting out of the present consideration the results of experiments, in which the effect of stimulating the nerves of arteries was

* See Lect. on Inflammation.

† Hoffmann von der Empfindlichkeit, &c. § 842.

‡ Trans. for Improvement of Med. Knowl., vol. iii. p. 448. Such cases seem to affect very much the doctrines, maintained by Wedemeyer and others, that all the phenomena of the arterial pulse may be imitated exactly, when life has been for many hours extinct, by impelling water into the vessels by successive jets from a syringe; that the pulse is owing entirely to the impulse communicated by the heart, in consequence of which the artery is partly dilated, and partly made to shift its place; that all the phenomena of the circulation may be referred to the elastic contractility of the arterial coats, and that the greater arteries, therefore, contribute to move the blood forward only by restoring, through their elastic reaction, the force expended in dilating them. The power of arteries to contract beyond the point to which their elastic materials will bring them, as demonstrated by Hunter, is here also to be remembered, as not admitting of explanation without reference to a vital contractility. — En.

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system.

examined, and about which the flattest contradictions prevail, let us only recollect the quick action of blushing; the instantaneous paleness of fear; the influence of the mind over the secretions; and the sudden distention of the corpora cavernosa from mental causes; and we can scarcely fail to conclude, that the arteries are under the influence of the nervous system.

8. One important argument, in favour of the contractile power of the arteries, is derived from cases in which the circulation was carried on, although the heart was either wanting, defective in its structure, or more or less ossified. Examples of the first kind are recorded by Hewson* and Brodie†, and of the latter by A. Burns, and other writers. According to Mr. A. Burns, the left ventricle of the heart may be so ossified, that it can have no share in propelling the blood into the arteries. Yet the circulation is continued through all parts of the body. And, from what happens in cases of ossified arteries, he infers, no doubt with considerable exaggeration, that the circulation can be much better conducted without the action of the ventricles, than without the reaction of the arteries. The cases of ossified heart reported by Mr. A. Burns are highly interesting.‡

Drs. W. Philip and Hastings§, in their experiments, saw the circulation in the small vessels continue for some time after the heart had been removed from the body; a circumstance hardly explicable without the admission of an action in the vessels themselves.

9. It is decidedly proved, that, during life, an artery can contract below its middling diameter, or that width to which its mere elasticity would reduce it. How can this be effected, but by muscularity?

10. Arteries, empty at the moment of death, and even contracted below their middling diameter, recover their ordinary size as soon as the vital influence is completely exhausted. Their muscular power is then annihilated, and their elasticity predominates.||

¶ From the tenour of all that has been said, the existence of a power of contraction in the minute vessels can hardly be doubted, whatever may be the opinion espoused respecting the muscularity of the arterial trunks. Some physiologists, not exactly agreeing with Mr. Hunter, may yet be disposed to consider the latter simply in the light of a mechanical or hydraulic system, and the capillaries as the physiological or vital organs. ¶

* Exp. Inq., vol. ii. p. 15.

† Phil. Trans., 1809, p. 161.

‡ On Diseases of the Heart, p. 129, &c.

§ Treatise on the Mucous Membrane, Introd., p. 51.

|| See Experiments in Hunter on the Blood, p. 116, &c.

¶ See Bostock's Physiology, vol. i. p. 403. Dr. Marshall Hall inclines to the opinion, that the capillaries are rather passive than active canals, through which the blood is circulated by the impulse of the arteries, the absorbing action of the veins, and also by capillary attraction. He fully admits, however, the contractility of the small arteries. (On the Circulation, &c.) Galvanism would appear, from the investigations of Dr. Reuss, of Moscow, and those of M. Dutrochet, Mr. Faust, Dr. Mitchell, and Dr. Stevens, to exercise a locomotive influence on the circulating fluids. For information on this curious question, see *Nouvelles Recherches sur l'Endosmose et l'Exosmose*, &c. par M. Dutrochet, 1828; Faust's Experiments, &c. on the Endosmose and Exosmose of Gases, and the Relation of these Phenomena with Respiration; Amer. Journ. of Med.

The wisdom with which the structure of the body is contrived, is most convincingly exemplified in the vascular system. We have instances of it in the universal situation of the arterial trunks in the direction of the flexion of the joints,, whereby they are hindered from being overstretched, and are protected from external injury; in their occasional tortuosities, by which they are enabled to adapt themselves to the continually changing positions of organs, without suffering from extension; and in their anastomoses, or frequent communications with one another, by which the necessary supply of blood to parts is rendered secure, when any particular trunk is temporarily obstructed by pressure, or permanently obliterated by this and other causes.

I. Machinery of the sanguineous system.

Protected situation, windings, and anastomoses of arteries.

Capillaries.

After having divided, and ramified to a considerable extent, and in a manner generally resembling the branching of a tree, the arteries, both of the greater and lesser circulations, terminate in the general capillary system. The exact point at which the arteries end, and the capillaries begin, cannot be demonstrated. According to Bichat, it is where the blood ceases to be at all under the influence of the heart, and the circulation is first maintained altogether by a contractile power of the minute vessels, to which he allots the mysterious term of insensible organic contractility. But, this imaginary limit would not satisfy many physiologists, particularly those who argue, that the action of the heart always extends its effect to the capillaries, as well as the arteries in general. Anatomists commonly describe the arteries as terminating in excretory tubes, exhalants, veins, &c.; but, in reality, the capillary system constantly intervenes between those vessels and the arteries. The microscopic investigations of Dr. Marshall Hall into the action of the capillary vessels tend to show, that they are a network of pellucid vessels, differing from the small arteries in the circumstance of their subdividing without becoming smaller; and freely anastomosing with each other, like nervous plexuses, forming thus, as Bichat always inculcated, an intermediate system of vessels between the arterial and venous system.* As already observed, while the large arteries are regarded by some physiologists as merely mechanical tubes, the minute ones, or capillaries, are known to be the part of the vascular system, in which all the important objects of the circulation are mainly prepared and accomplished, as nutrition, secretion, the oxydation of the blood, its decarbonization, &c.†]

Science, vol. vii. Nov. 1830; Stevens on the Healthy and Diseased Properties of the Blood, &c. — Ed.

* On the Circulation of the Blood, by Marshall Hall, M.D. Wedemeyer's account of the structure and disposition of the minute vessels is contained in his "Untersuchungen über den Kreislauf des Bluts," 1828; or in the 100th No. of the Edinb. Med. Journ., July, 1829.

† With regard to exhalant pores, Dr. Wedemeyer objects to the notion that they are visible and *organic*, or, as he explains the term, endowed with a species of contractility, by means of which they retain certain substances, and discharge others. He maintains, that if any such pores existed, they would be perceptible with the aid of the microscope; and he considers that all the phenomena of exhalation may be produced through invisible pores, or the interstices between the ultimate particles which form the organic tissues, and may be explained by the phenomena of capillary attraction, as modified by the action of the nervous system on textures. In these views, as has been correctly noticed (Edinb. Med. and

I. Machinery
of the san-
guineous
system.

Diameter of the
arterial system,
a cone.

Conic propor-
tion varies in
different ages.

Why the pulse
different in dif-
ferent ages.

Why the ar-
teries are
found empty
after death.

Why blood is
accumulated in
the chest after
death.

I have observed, that the force, with which the blood is at first projected from the heart, is progressively diminished by the resistance it encounters in the thick and powerfully elastic tunic of the trunks or large arteries into which it is immediately propelled. There are two other causes which co-operate in producing a progressively diminishing force. The first is the short angles against which the blood has to strike at the origin of all the different branches; and the next, and most important, is the larger diameter of the general mass of the arteries, compared with that of the heart, or the arteries from which they immediately proceed; the range of the diameter augmenting in proportion to the increase of the ramifications. From experiments, indeed, made by Mr. John Hunter on the carotids of camels and swans*, the very same arteries appear gradually to widen from the end nearest the heart to that most remote from it. From all which he concludes, that the aggregate diameter of the arterial system forms a cone, whose apex is at the heart. And he concludes also, and most correctly, that this conic proportion is most obvious, increases most rapidly, and spreads with its broadest base in infants, or rather in the fetus; for here the main trunks of the arteries are extremely short, while the capillaries are very large, and, from the obliteration of many vessels in subsequent life, more numerous than at any other period. It is highly probable, indeed, that while the aorta in childhood is not a fourth part of the size of the same vessel in an adult, the aggregate of the capillaries of the former possesses a diameter more than four times as large as the aorta in the latter.

We may hence, in some degree, account for the difference in the quickness of the pulse at different periods of life. In early infancy it beats as much as 140 strokes in a minute; towards the end of the second year it is reduced to 100; at puberty it is only 80; about virility 75; and after sixty years of age seldom more than 60 in a minute. For reasons connected with the preceding, it is more frequent in persons of short stature, those of strong passions of mind, those of great muscular exertion, and in females. From the increasing diameter of the blood-vessels as they diverge from the heart, the blood has a greater space for moving forward, and is able to move with more freedom; and hence one reason for the empty state in which the arteries are found immediately after death: a second reason is, that the tunics of the veins, possessing little or no elasticity, readily dilate to the distensive power of the blood as it moves forward: a third, and, indeed, the principal reason, as sufficiently proved by Dr. Carson, is the natural elasticity or resilience of the lungs, which, by keeping them after death in a state of dilatation, allows the blood to accumulate here as in the vacuum. And hence, again, the reason of the accumulation of blood, which is usually found in the chest after death, as well as the empty state of the vessels.

Surgical Journ. for July, 1829, p. 87.), he approaches closely to the theory which M. Dutrochet has founded on his discovery of endosmose and exosmose. (See op. cit., No. 99.) Magendie's experiments tend to establish the fact, that the exhalants do not terminate in open orifices, but that exhalation and secretion take place through the thin coats of the vessels. — Ed.

* On Blood, Inflammation, &c. part 1. sect. viii. p. 170.

This vacuity of the arteries after death, was one of the objections urged very forcibly by the ancients against the circulation of the blood, or even its following at all the course of the arteries; and which Dr. Harvey very unsatisfactorily replied to, by asserting, contrary, indeed, to fact, that the heart continues to contract for some time after death, and even after it has received blood; for it is generally found loaded with blood.*

I. Machinery of the sanguineous system.

The above facts urged against the doctrine of circulation.

Diameter of the aorta and pulmonary artery alike.

Balance of arterial and venous blood, how maintained.

The pulmonary artery, which receives from the heart the blood returned into it from the veins, bears a very close proportion to the diameter of the aorta†, which sends the blood from the heart over the whole of the larger circulation. The aorta possesses more strength, but their elasticity is nearly equal, and the measure of each, on being slit, is about $3\frac{3}{8}$ inches: and hence there can be little doubt, that the quantity of blood sent back to the heart is on an exact balance with that which flows from it. It is not, however, at any time the identical blood, which is thus returned to the heart; for every organ takes from the general current, as it visits it, such parts and such principles as it stands in need of to support the wear and tear of its own action; while another considerable portion is thrown off, as we have already observed, in the form of secretions or exhalations, from various emunctories that open externally or into internal cavities. But the drain which is hereby produced on the arterial blood, is compensated by the various fluids collected from every part by the absorbent vessels, and by the flow of the chyle from the digestive organs; both which are poured into the thoracic duct, and finally intermixed with the returning current of venous blood a short time before it reaches the heart; and, in this manner, the balance of arterial and venous blood is maintained.

Sum total of the blood estimated very differently.

With respect to the actual quantity of blood contained in the entire system, our means of determination are so inexact, and consequently the calculations, or rather the conjectures, that have been offered upon the subject, are so strikingly discrepant, that it is not easy to reach a satisfactory conclusion. It is only necessary to state a few of the different opinions that have been offered, to show the absurdity of several of them. Muller and Abeildgaard estimate the weight, even in an adult, at very little more than eight pounds‡; Borelli at 20; Planch at 28; Haller at 30; Dr. Young at 40§; Hamberger at 80; and Keil at 100. Blumenbach states the proportion in an adult healthy man to be as 1 to 5 of the entire weight of the body. Yet, little reliance can be placed on this last mode of determination, on account of the great diversity, in point of bulk and weight, of adults, whose aggregate quantity of blood is in all probability nearly alike. The mean numbers, as those of Baron Haller and Dr. Young, making the amount from 30lb. to 40lb., appear most reasonable; and, perhaps, fall not far short of the sum intended by Blumenbach. The subject requires further examination, and a nicer estimate.

II. Moving powers of the sanguineous system.

II. There is another question, which has also, in all ages, greatly occupied the attention of physiologists, but upon which we still

* See Dr. Carson "On the Vacuity of the Arteries after Death." *Medico-Chir. Trans.*, vol. xi. part i.

† See Hunter on Blood, p. 133.

‡ Blumenb. *Elem. Phys.*, p. iv. sect. 6.

§ *Phil. Trans.*, 1809, p. 5.

II. Moving powers of the sanguineous system.

Cursory notice of the several principal theories of the circulation.

remain in a very considerable degree of indecision; and that is, the MOVING POWERS employed in the circulation; or, in other words, the projectile force by which the blood is sent forward.

[Harvey, Haller, Spallanzani, Legallois, Parry, and Magendie maintain, that *the sole moving power of the blood is the action of the heart*. Pecquet, Bartholine, Bohn, Senac, Verschuur, Zimmermann, John Hunter, Blumenbach, Sœmmering, Langenbeck, Tiedemann, Béclard, Sir E. Home, Dr. Hastings, and Dr. W. Philip infer from their researches, that *the circulation does not depend on the heart alone, but is also supported by muscular contraction of the arteries*. Darwin, Bichat, Richerand, and probably Meckel, deny, that the greater arteries possess vital contractility, or contribute to the propulsion of the blood, but assign to the smaller arteries and capillary vessels *a vital contractility, through means of which the blood is first attracted, and then propelled, and ascribe to the circulation in them a nearly complete independence of the influence of the heart*. Others, as Carus, Treviranus, Döllinger, and Oesterreicher, are led by their enquiries to believe, that neither the larger arteries, nor the capillary vessels, contribute by their contractions to the progress of the blood; but, that *the blood moves chiefly through means of its vitality, or an inherent power of motion*, and that its movement, as thus effected, is materially supported by the action of the heart alone.*]

What excites the heart to contract.

The heart forms the salient point of motion, and with its systole or contraction the circulation commences. But what is it that excites the heart to contract? One of the most common answers to this question, in the writings, of physiologists, is, the flow of the blood into the ventricles. But this is merely to argue in a circle; for the question still returns, what is it that makes the blood flow into the ventricles? Others have referred the cause to an immediate impulse from the brain. Now, in contractions of the voluntary muscles, there is no doubt of the existence of such an impulse, for we are conscious of it, and assent to it; but we are neither conscious of, nor assent to, any thing of the kind in respect to the contraction of the heart; and are perfectly sure, that no such power of the will takes place during sleep. It is a mere assumption; and an assumption which can only apply to a part of the great animal kingdom, even during wakefulness; for, as it is only in mammals and birds that the nerves can be thus influenced in their passage to the heart, the postulate does not account for the contraction or dilatation of the heart in other classes of animals.†

Hunter's stimulus of necessity, what.

Mr. John Hunter ascribes this action of the heart, or rather the whole career of the circulation, of which he regards the action of the heart as a single and ordinary link in the general chain, to what he calls a stimulus of necessity; by which he seems to mean, an instinctive power, dependent on the general sympathy of

* See Wedemeyer's *Untersuchungen über den Kreislauf des Bluts*, &c. Hannover, 1828; and *Edinb. Med. and Surgical Journ.*, No. c., July, 1829, in which a detail of the contents of Wedemeyer's treatise will be found; the first part of which treats of the part performed by the greater arteries in the circulation; the second, of the movement of the blood in the minute arteries and capillaries; the third, of the movement of the blood independently of mechanical actions; and the fourth, of the phenomena of capillary attraction in the animal system.—*Ex.*

† Hunter on Blood, p. 148.

the system, which in every part is craving or demanding such an alteration; or, in other terms, is uneasy without it. His words are as follow: — “The alternate contraction and relaxation of the heart constitutes a part of the circulation; and the whole takes place in consequence of the necessity, the constitution demanding it, and becoming the stimulus. It is rather, therefore, the want of repletion, which makes a negative impression on the constitution, which becomes the stimulus, than the immediate impression of something applied to the heart. This we see to be the case, wherever a constant supply, or some kind of aid, is wanted in consequence of some action. We have as regularly the stimulus for respiration, the moment one is finished an immediate demand taking place; and if prevented, as this action is under the influence of the will, the stimulus of want is increased. We have the stimulus of want of food, which takes place regularly in health, and so it is with the circulation. The heart, we find, can rest one stroke, but the constitution feels it; even the mind and heart are thereby stimulated to action. The constant want in the constitution of this action in the heart, is as much as the constant action of the spring of a clock is to its pendulum, all hanging or depending on each other.”*

II. Moving powers of the sanguineous system.

Regarded as the primum mobile of the heart.

Mr. Hunter’s “Treatise on the Blood” is a work of such sterling merit, so rich in its facts, and so valuable in its remarks, that, notwithstanding a few nice-spun and chimerical speculations that occasionally bewilder it, there is no book on physiology which a student ought to study more assiduously. Yet I am much afraid, that the language now read has no great deal of meaning in it; and that it does little more than tell us, that the heart contracts because it contracts, or, rather, that the circulation takes place because it takes place.

Little meaning furnished by such an explanation.

Few physiologists indeed seem to have adopted this opinion: and hence a far more plausible and intelligible hypothesis has been since offered. This consists in supposing the heart to be stimulated by the oxygen of the blood introduced into it in the lungs by the process of respiration. Such was the favourite opinion of Dr. Darwin; and such appears to have been the opinion of Blumenbach, who was so fully persuaded of the oxygenized state of the blood when first received by the heart and poured into the arteries, that he expresses a desire of changing the terms *arterial* and *venous* blood for *oxygenized* and *carbonized*.

Oxygen received from the lungs regarded as the primum mobile.

That oxygen, if introduced into the blood, would stimulate the heart, there can be no doubt, from numerous experiments which prove, that a very small quantity of any foreign body whatever, even an ounce or two of solution of gum-arabic, infused into the blood by opening a vein, will not only stimulate the heart, but the stomach, intestinal canal, and other organs, with which the heart readily sympathises.† [Whether the gum-arabic thus injected into the veins would stimulate the preceding viscera, requires proof; but various experiments of M. Magendie show, that it would produce death on another principle; namely, that of obstructing the

* On Blood, p 149

† De Chirurgiâ Infusoriâ renovendâ. Aut. J. M. Regnaudot. 8vo. Lugd. Bat. 1779.

II. Moving powers of the sanguineous system.

capillary circulation in the lungs. The hypothesis of Darwin is refuted by the fact, that it would at all events only account for the contraction of the left cavities of the heart; since those of the right side, which perform their contractile functions perfectly well, receive blood that has not undergone the oxygenating change of respiration. Mr. Brodie found in his experiments on rabbits, that the heart continued unaltered for at least two minutes after that viscus and the great blood-vessels were empty of blood; and hence he concluded, that its action does not depend upon the presence of the blood in its cavities.* It should also be recollected, that if the contact of the blood were necessarily followed by the contraction of the heart, this organ would never be relaxed, because, though the quantity of that fluid undoubtedly varies at different moments in the auricles and ventricles, it is difficult to suppose that they are ever free from it. Senac's doctrine, that the contraction of the heart is caused by the stimulus of the distention of the blood, is also one that cannot now be retained.]

By what power is the circulation maintained after it has once commenced?

Harvey's opinion.

But passing by, till this question is settled, the doctrine of the *primum mobile*, or first moving power, of the blood from the heart — by what means is the motion, thus mysteriously commenced, maintained afterwards through the whole circulatory course? Harvey replied to this question by asserting, that it is maintained by the action of the heart alone, which propels the blood equally through the entire length of the arteries and veins, both which he regarded as tubes alike inert, and in no respect contributing to the propulsive energy.

At first received with universal assent.

This dictum was at first received with universal assent; and the mechanical physiologists immediately set to work, in order to calculate the force with which the heart acts at every contraction, in the same manner as they had endeavoured to calculate the force of the stomach in the process of digestion. It is not necessary to enter into the details of these estimates. It is sufficient to observe, that, from Michelot to Sauvages or Cheselden, they all differed from each other as widely as in calculating the quantity of blood in the system; and that, while Keil estimated the projectile power of the heart at five ounces, and Hales at fifty-one pounds [and a half, Borelli fixed it at no less than one hundred and eighty thousand pounds.†

But no common result arrived at.

The heart itself not the sole propulsive power.

Proofs of this assertion.

There are various facts, however, (and several have been already mentioned in the course of this proem,) which sufficiently prove, that the heart cannot be the sole propulsive power through the entire range of the circulation. The two following are also much insisted upon: Firstly, that the pulse, if the systole of the heart were the only projectile force, must take place, not SYNCHRONOUSLY all over the system, as it is well known to do, except in a few morbid cases in which local causes interfere, but SUBSEQUENTLY to the contraction of the heart, and SUCCESSIVELY through the whole line of the arterial tubes, in proportion as they lie more re-

* See Cooke on Nervous Diseases, *Introd.*, p. 61.

† For some valuable matter on this point see the *Researches of J. L. M. Poiseuille on the Force of the Aortal, or Left Side of the Heart*, in *Breschet's Répertoire Gén. d'Anat.*, &c. 3me trimestre de 1828; or, the translation in *Edinb. Med. and Surgical Journ.*, No. for July 1829, p. 28.—ED.

mote from the salient point.* And, secondly, that whatever may be the projectile power of the heart, it must altogether cease with the arteries, and cannot reach the veins.

And hence arose another hypothesis, which ascribed the propulsive power to a progressive *vis à tergo*, or a force communicated from the ventricles of the heart to the commencement of the arteries, producing a vibration or alternate dilatation and contraction of their tunics, through their whole length, to the veins; and thus acting in conjunction with the projectile force of the heart itself.

In proof of this auxiliary power afforded by the coats of the arteries, the phenomenon of pulsation was triumphantly appealed to; which, it was maintained, gave a direct and incontrovertible evidence, that an alternate dilatation and contraction, or enlargement and diminution, in the diameter of the arteries, is constantly taking place. This, by Bichat, is attributed solely to the locomotion of the arterial tubes, propagated to their terminal ramifications, and thence continued to the veins; but, by most modern physiologists, to a joint power, compounded of the action of the heart and the arteries.

Bichat's doctrine has of late been incontrovertibly refuted by one or two very simple experiments of M. Magendie.† Besides which, however, it is now a well-ascertained fact, and one that has been thoroughly elucidated by Dr. Parry of Bath, that no increase of size, or indeed change of bulk of any kind, takes place in arteries, during either the systole or diastole of the heart's ventricles in a state of health.‡ The arteries of animals, to ascertain this point, have been exposed in different parts, and to considerable lengths, without evincing the least apparent increase of size. And hence it is the pressure of the finger, or of some other substance, against the side of an artery that alone occasions pulsation, in consequence of the resistance hereby made to the regular flow of the blood; the alternating beat being produced by the greater momentum with which the current strikes against the finger or other cause of obstruction, during the systole, than during the diastole of the heart.

Döllinger confirmed Parry's experiments, by laying bare the carotid of a dog before his pupils, which gave to the eye no proof of altered form or motion, though a pulse was distinctly felt by the finger. And in like manner, a pulsatory motion is always felt by the fingers, when applied to a leaden water-pipe while a pump is at work upon it at one end, and alternately giving a fresh pressure to the column of water it contains by forcing in a fresh supply: yet the pipe is all this time incompressible.

[Sir David Barry plunged his arm into a horse's chest, and found the aorta constantly full, without any variation of its distention for an instant, though he took hold of it for five minutes, and repeated the experiment. On the other hand, the vena cava was so little distended that it felt like a thin flaccid membrane.§]

* This is still maintained to be the fact by M. Poiseuille, as will be presently noticed. — Ed.

† Précis Élémentaire de Physiologie, tom. ii. p. 320.

‡ Exp. Inquiry into the Nature, Cause, and Varieties of the Arterial Pulse, &c. Bath, 1816.

§ Dissert. sur le Passage du Sang à travers le Cœur, p. 78. Paris, 1827.

II. Moving powers of the sanguineous system.

Hypothesis of *vis à tergo*.

Supposed proof derived from pulsation.

Bichat's explanation.

Arteries sustain no change of bulk from pulsation.

Pulsation alone produced by pressure from without.

II. Moving powers of the sanguineous system.

The pulse of an inflamed part rarely synchronizes with that of the heart or of the neighbouring parts.

Whether the pulsations in inflamed parts ever exceed in number those of other parts of the body?

Capillaries possess more contractibility than the larger arteries.

Confirmed by Bostock.

Important effect of this fact on inflammation.

Hence the hypothesis of a *vis à tergo* unsatisfactory, whencesoever derived.

In inflammation, the pulse of the inflamed part, in consequence of local excitement, is much more frequent than that of the heart or of any other organ. Thus, in a whitlow, the radial artery may give to the finger a hundred pulsations in a minute, while not more than seventy strokes may be exhibited in any other part of the system. The rapidity of the pulse is in this case usually in proportion to the degree of the inflammatory action*: and hence, if the system should labour at the same time under ten different inflammations in different parts or organs of a different structure, as glands, muscles, and membranes, it is possible, that it may have so many different seats of pulsation taking place at such different parts at one and the same time, while all of them are at variance with the pulsation of the heart. Even where there is no inflammation, such discrepancies in the pulse are occasionally to be met with, insomuch that Riel gives a case in which the heart, the carotids, and the radial arteries all pulsated differently†; and we can hence readily perceive, why they should be more frequent and striking under the increased action produced by inflammation, and often, in a debilitated organ, more disposed to irregular action, and particularly irregular contractile action, in its capillaries.

[Respecting the correctness of the statement, that the pulsations of inflamed parts are often more numerous and frequent than those of the rest of the system, the editor has never seen a case in confirmation of it; and, were not the thing asserted by so many men of eminence, he should be inclined to set it down as erroneous. In whitlows, and other cases, the arteries leading to the part affected throb with increased force; but never, as far as the editor's observations reach, with a quickness exceeding that of the action of the heart. However, if the statement made by writers be accurate, physiologists need no longer doubt and dispute about the muscularity of arteries, and even of those which cannot be regarded as capillaries, to which all physiologists impute a contractile power, under some name or another.]

We are let a little into the mystery of the above-mentioned phenomenon by the curious fact, that some of the arteries possess a higher degree of contractile power than others, and that *the capillaries possess the highest measure allotted to any of them*. "Indeed, every fact," observes Dr. Bostock, "with which we are acquainted, respecting the mechanism and functions of the sanguiferous system, lead us to the same conclusion, that the large arteries are to be regarded as canals transmitting the blood from the heart, where it receives its great impulse, into the smaller branches; and that it is chiefly in these smaller branches that it exercises its various functions."‡ We may hence see why the capillaries are, in many cases, so much sooner excited than the larger canals, and exhibit so much more violence of action: a distinction of high importance in explaining the doctrine of inflammation, though it has been less attended to by pathologists than it deserves.

The hypothesis, therefore, of a *vis à tergo*, whether dependent upon the heart alone, upon the arteries alone, or upon a combination of the two, has by no means proved sufficiently satisfactory, or

* Exposition of the Principles of Pathology, &c. By Daniel Pring, M.D. p. 119. 8vo. 1823.

† Memorabilia Clinica, vol. ii. fascic. 1-6. Hall. 1792.

‡ Elementary System of Physiology, vol. i. p. 402. 8vo. 1824.

been sufficiently supported by evidence in respect to the entire circulation. Under no modification does it account for the flow of the blood through the veins. And in regard to the whole of the views which have been thus far examined, Mr. John Hunter, as I have already observed, was so extremely discontented, that he placed no more stress upon one part or organ of the sanguiferous system than upon another; upon the heart than upon the arteries; or upon the arteries than upon the veins; regarding the whole economy as the result of a sort of instinct, to which, as just noticed, he gave the name of a stimulus of necessity; and which opinion he supported by making an appeal to insects which have no proper heart; to worms, most of which have no heart whatever; and to monsters which have been born without a heart; whilst at the same time he contended, that veins, at least the larger, exhibit, under certain circumstances, an expansile and contractile power as well as arteries. "I think it probable," says he, "that where there is an universal action of the vascular system, the action of the arteries and veins is alternate: that where the arteries contract, as in many fevers, the veins rather dilate, more especially the larger."* And it is hence, again, highly probable, that, in this "universal action of the vascular system," the secernents, or extreme arteries, take an important part; and not impossible, though the thing needs proof, that they operate, as has been suggested by Dr. Pring†, by a kind of suction, which may be regarded as a *vis à fronte*.

Upon the whole, we may conclude with Haller, that the heart exerts a very considerable degree of force in the general economy of the circulation, although it is impossible to estimate its power with mathematical precision. And we may reasonably refer the first or arterial half of the general circuit of the blood to this force, if not alone, in conjunction with the aid contributed by the elastic and contractile tunics of the arteries themselves, whether pulsation be a result of these powers alternately exercised, or of mere local pressure.‡

II. Moving powers of the sanguineous system.

Further opinions of Mr. J. Hunter.

Action of secernents.

Moving power of arterial circulation.

* On Blood, p. 187.

† Ubi supra, p. 132. 165. With respect to Bichat's doctrine, that the impulsive power of the heart is almost nugatory in relation to the blood in the capillaries, Dr. Wedemeyer does not admit its correctness, observing, that the transmission of the heart's impulse, even to the extreme capillaries, may be inferred from the slight force required to impel water, a solution of indigo, or fresh drawn blood, through them with a syringe, even from a large artery; a force certainly inferior to that with which the blood in the same artery flows through it under the action of the heart during life. This statement, as an able critic has remarked, receives corroboration from the late discovery of M. Poiseuille, of Paris, that each molecule of blood retains the force it received from the heart, even after it has passed through a long course, and through many subdivisions of the arterial system. (Edinb. Med. Journ., No. c. p. 88.) That the impulse of the heart extends even to the capillaries is further shown by the effects of depletion, or of fainting, on sanguinolent secretions, on redundant secretions, and on hemorrhage. — En.

‡ It would appear from Dr. Poiseuille's experiments, that the force with which a molecule of blood moves in the carotid or in the aorta, is precisely the same with the force of its movements in the smallest arterial branches: or, in other terms, that a molecule of blood moves with the same force throughout the whole arterial system; "a fact," says this author, "which I was far from anticipating. It is not easy to account for the uniformity here unfolded. When the heart contracts, a wave of blood is pushed into the arterial system, already full of blood. The phenomena that ensue are dilatation of the arteries, and a

II. Moving powers of the sanguineous system.

Moving power of venous circulation.

Vacuum in the heart produced by its systole.

General circulation produced by the double power of the heart acting as a forcing and suction pump; assisted by surrounding agency.

It yet remains, however, to account for the second half, or that which consists in the passage of the blood through the veins; and, upon this subject, there is one most important and elucidating fact, which, till of late, has never been in any degree brought forward in the course of the inquiry. It is this: that, when the heart, by the contraction of its ventricles, has exhausted itself of the blood contained within it, a comparative vacuum must follow, and the blood from the *venæ cavæ*, or venous system at large, be sucked up into the right auricle.* This ingenious remark seems first to have been thrown out by Dr. Wilson Philip†: and Dr. Carson, of Liverpool, taking advantage of it, has constructed a simple and beautiful theory of the projectile powers employed in the circulation, the general principle of which may be expressed in a few words. The heart is supposed to act at one and the same time in a twofold capacity. By the contraction of the ventricles, it propels the blood through the arteries; and by the dilatation of the auricles, it draws it up from the veins. It is at once, therefore, a forcing and a suction pump. The contraction of the heart, and consequently its comparative vacuum, are supposed to be considerably assisted by the elasticity of the lungs, and the play of the diaphragm, which we had occasion to notice at some length in our physiological proem to the preceding class, and the great resistance which they jointly afford to the atmospheric pressure; whilst this very pressure, applied on every part of the exterior of the animal frame, contributes in an equal degree to the ascent of the blood in the veins; for, as the column of venous blood is perpetually girt on all sides, and cannot fall back because of the numerous valves with which the veins are furnished, it must necessarily take an opposite or ascending direction.

A suction power, however, as existing in any part of the heart, has been positively denied by Sir David Barry; whose hypothesis transferred it from the ventricles of this organ to the cavity of the thorax, or rather, to the great veins contained within such cavity. The grand cause of the venous part of the circulation is, with him, "atmospheric pressure, diminished, or entirely taken off, around the cardiac ends of the venous tubes during the expansion of the chest, but unaltered and entire around every other part of their surface, opposed only by the gravity of the fluid acted upon."‡ He has, indeed, sufficiently shown, by a multitude of

kind of locomotion of the arterial system, by which its curvatures tend to straighten themselves. These changes cannot take place, except at the expense of the force with which the wave is propelled from the heart. But hardly has the arterial system become dilated, and scarcely have its curvatures yielded to the action of the heart, when the arteries, through the elasticity of their coats, contract again, and restore to the force of the blood all the loss it had sustained. In this way, perhaps, we may explain how the intensity of the force, communicated to the blood by the heart, is preserved (as the experiments referred to show), even to the last arterial ramifications." See *Edinb. Med. and Surg. Journ.* for July, 1829, or *Breschet's Répertoire Gén. d'Anat.*, &c. 1828.

* Bichat and Dr. Bostock deny the existence of this suction-power, which, however, has Wedemeyer in its favour, who conceives that the heart has the power of promoting the capillary circulation, though only in a feeble degree, by the suction-power of its *auricular cavities*, or the blood in the veins. — *Ed.*

† *Inquiry*, &c. pp. 9. 11. 16, &c.

‡ *Experimental Researches*, &c. p. 57. 1826.

experiments, that the suction operation of the great veins is precisely coincident with the instant, in which the animal experimented upon endeavours to form a vacuum in the chest: that the black blood passes through the veins only during the act and time of inspiration; and that this venous movement is always placed under the influence of atmospheric pressure. There can, hence, be no doubt that the action of the atmosphere upon the cavity of the chest, during the alternating process of inspiration and expiration, exercises a much more powerful effect upon the circulating system than has hitherto been taken into the account. But, as the pulsation of the heart and arteries may be made to continue with regularity, even in mammalian animals, by a forced quiescence of the lungs, for sixty or eighty strokes in succession, in divers for half an hour, and in syncope for a much longer period of time; and, as a like circle of action is found to prevail in animals below this rank, as in fishes and reptiles, whose mode of respiration is different, and does not allow of the same thoracic suction power, Sir David Barry seems to have overrated the assistance which the venous circulation derives from this quarter, in concluding, that, of all the contributing forces, "the pressure of the atmosphere is by far the most intense in its degree, the most constant in its influence, and the most unvarying in its amount: that, without which, the circulation could not be maintained beyond a few moments."* It is well observed by Dr. Bostock, that, in the healthy state of the system, we respire, upon the average, about twenty times in a minute, while the average velocity of the pulse may be estimated at eighty, so that the heart contracts *four times during each act of respiration*; and must consequently receive the blood during all the various states of distention to which the lungs are subject; yet we do not perceive that the pulse exhibits any corresponding variations either in its strength or its velocity. And, further, we shall find it very difficult to produce any effect upon the pulse by the most powerful voluntary efforts of inspiration or expiration; yet, in such cases, the capacity of the thorax will certainly undergo a much greater change than it can possibly experience in its ordinary action.†

II. Moving powers of the sanguineous system.

Atmospheric pressure, and thoracic suction.

* Experimental Researches, &c. p. 58. 8vo. 1826.

† Elementary System of Physiology, vol. ii. p. 56. 8vo. 1826. The above observations on Sir David Barry's theory were lately found amongst Dr. Good's papers, and would have been inserted in the last edition of this work, had they been put into the editor's hands early enough for the purpose. Wedemeyer infers from an experiment made on a horse, the particulars of which are given in the Edinb. Med. Journ., No. c. p. 89., that, in the natural state of the breathing, the suction power must be very insignificant, which, according to Sir David Barry's researches, is exerted upon the venous blood by inspiration. Wedemeyer objects to that author's statements, 1. That the tendency to a vacuum in the chest during inspiration must be completely overcome by the entrance of the air, an elastic mobile fluid, before any material suction power can be exerted on a heavy inelastic liquid, such as the blood. 2. That the afflux of blood in a tube towards the jugular vein of the horse, was observed by Sir David Barry to correspond with inspiration only when the animal was lying, and consequently breathing with unnatural force with one side only of the chest; and that, in the erect posture, no such correspondence is to be observed, unless the animal be excited to violent respiration. 3. That the tendency to a vacuum in the chest cannot account for the movement of the blood in the pulmonary veins, which are subjected outwardly to the same power which is supposed to act on the blood within them. 4. That the venous circulation may be kept up in the mammalia by artificial breathing, for twenty-five minutes or longer after decapitation, although, in such circum-

II. Moving powers of the sanguineous system.

Difficulties still remaining to be explained.

Communication between remote organs distinct from that of the blood.

Between the spleen and stomach.

Between the stomach and bladder.

This subject entitled to further inquiry.

There are, nevertheless, numerous difficulties that yet remain to be explained; such as the proportion of projectile power furnished by the conducting pipes themselves; by what means the want of a diaphragm is compensated in birds and reptiles which have no such organ; what constitutes the projectile power in animals that have no heart, and consequently no double pump to work with*; [the mode of contraction in the vessels; since, as there are no valves in the arteries, if the contraction be supposed to take place simultaneously in their whole course, it may appear to some physiologists as likely to have a tendency to propel the blood backwards or forwards. Indeed, Bichat avails himself of the fact, that the arteries have no valves, to strengthen his position, that these tubes cannot be muscular.]

There is also another curious fact, which physiology has pointed out, but has never hitherto been able to explain; and that is, a direct communication between remote or unconnected organs, apparently, by some other channel than the circulation of the blood. Something of this kind seems to exist between the spleen and the stomach, the former of which has been proved by Sir Everard Home to receive fluids from the cardiac portion of the latter, though we can trace no intercourse of vessels: but the most extraordinary example of this kind which at present we seem to possess, is, the communication which exists between the stomach and the bladder. For the experiments of Sir Everard Home†, and the still more decisive ones of Dr. Wollaston and Dr. Marcet‡, seem to have established beyond a controversy, that certain substances introduced into the stomach, as rhubarb, or prussiate of potash, may pass into the bladder without taking the course of the blood-vessels, and consequently by some other channel; a channel, indeed, of which we know nothing.§ This is a subject well worth studying: for if two organs, so remotely situated as the stomach and the bladder, be thus capable of maintaining a peculiar intercourse; so other organs may possess a like intercommunion; and, by such means, lay a foundation for those numerous sympathies between distant parts which so often strike and astonish us. M. Magendie's hypothesis, that veins are absorbents, may explain the facts in Sir Everard Home's experiments, but has no bearing upon that of Dr. Wollaston and Dr. Marcet.

stances, the chest internally is constantly subjected to pressure; and that in frogs and other cold-blooded animals, the venous circulation will continue for hours, after the breathing has been annihilated by laying open the chest. 5. That the venous circulation goes on in the fœtus, and in many of the lower animals, without any respiratory movements whatsoever. These objections, along with what has been advanced by Dr. Arnott on the subject, seem to an able critic to render the supposed discovery of Sir David Barry exceedingly doubtful. Vid. Edinb. Med. Journ., No. cc, and Wedemeyer's *Untersuchungen über den Kreislauf des Bluts*, 1828. — Ed.

* *Diatribæ Anatomico-Physiologica de Structurâ atque Vitâ Venarum: à Medicorum ordine Heidelbergensi præmio proposito ornata. Auctore Henrico Marx. 8vo. Carlsruhe, 1822.*

† *Phil. Trans.*, 1811, p. 163.

‡ *Ibid.*, p. 96.

§ In some particulars of a remarkable and perhaps quite unique case of *tæniæ*, voided from the *meatus urinarius*, it is stated by Mr. Law, of Penrith, who attended the patient, that the turpentine which she took by the mouth, found its way into the bladder in twenty seconds. The letter, mentioning this curious fact, was shown to the editor by his friend Mr. Docker, late of Canterbury. — Ed.

The discovery of the circulation of the blood has given a great importance to the DOCTRINE OF PULSATION; for by the strength or weakness, the slowness or frequency, the hardness or softness, the freedom or oppression, the regularity or irregularity of the beat of the artery against the pressure of the finger, we are now able to determine many momentous facts, relative, not merely to the state of the heart, but of the general system; and, in many cases, to prognosticate upon grounds which were altogether unknown to the earlier cultivators of medicine. And, on this account it is, that the Greek physicians took but little notice of the pulse, which, even in the days of Celsus, was regarded as a *res fallacissima*.

The pulse is influenced indirectly by the general state of the body, but directly by that of the heart, or of the arteries, or of both, or of the quantity of blood which the vessels have to contain.

In an adult male of good health, and not too corpulent, the common standard of the pulse may be fixed at seventy strokes in a minute; but it varies in different individuals from sixty to eighty, being greatly affected by the temperament, and partly by the habit of life. In the man of a high sanguine character, it rarely sinks below eighty, and is often at ninety; and in the melancholic, it seldom rises above sixty, and sometimes sinks to forty. In some idiosyncrasies the discrepancy is so considerable, and complicated with other changes than those of frequency and tardiness, that there is no reducing them to any rule. Sir John Floyer, who has numerous bright openings in the midst of a generally obscure horizon, set down the standard number of pulses in health at seventy-five, and affirms that they cease altogether at forty, and are followed by a loss of all sense and motion.*

Lizarri tells us, however, of a person whose pulse was not more than ten beats in a minute.† Dr. Heberden says, he once saw a person whose pulse, as he was told, did not number in the beginning of his illness above twelve or sixteen in a minute; though he suspects, in this and all other instances, where it is below forty, that the artery beats oftener than it can be felt; because such low pulses are usually unequal in their strength, and some of the beats are so faint as but just to be perceived; so that others, probably still fainter, are too weak to make a sensible impression on the finger. He had attended two patients, who, in the best health, had always very unequal pulses, as well in their strength as in the spaces between them, but which constantly became regular as the patient grew ill, and gave a never failing-sign of recovery in their once more returning to a state of irregularity.‡ In women the pulse is, generally speaking, six or eight strokes in a minute quicker than in men, and hence, many women, of firm health and a lively disposition, have a standard pulse of eighty-five.

In a weakly frame, the pulse is usually rapid; for debility is almost always accompanied with irritability, and the heart partakes of the general infirmity. In this case, also, from the feebleness with which the heart contracts, the ventricle is but imperfectly

II. Moving powers of the sanguineous system.

Doctrine of pulsation, and its importance.

Pulse, how influenced.

Standard in adult life.

Influenced by temperament and idiosyncrasies.

Singular instances.

Quicker in women than in men.

* The Physician's Pulse-Watch, &c. 2 vols. 8vo. Lond. 1707

† Raccolta d' Opusculi Scientifici, p. 265.

‡ Med. Trans., vol. ii. art. ii. p. 29.

II. Moving powers of the sanguineous system.

Rate in infancy.

In advanced life.

Singular anomaly.

To what number calculable by the finger.

Quickened by slight excitements.

emptied, and consequently sooner filled again, and sooner stimulated to contraction. Hence, in infancy the pulse is peculiarly quick, and gradually becomes slower as the child increases in strength. Dr. Heberden, who paid particular attention to this subject, estimates the pulse on the day of his birth, and while asleep, from a hundred and thirty to a hundred and forty; and fixes it at little less than the same rate, or that of a hundred and twenty strokes for the first month. During the first year he calculates it at from a hundred and twenty to a hundred and eight; during the second, at from a hundred to ninety; during the third, from a hundred and eight to eighty, at which it continues for the three ensuing years. In the seventh year, it is frequently reduced to seventy-two; and in the twelfth, to seventy.* In advanced age, the pulse sinks often considerably below sixty strokes in a minute. "I knew one," says Dr. Heberden, "whose chief distemper was the age of fourscore, in whom, for the last two years of his life, I only once counted so many as forty-two pulsations; but they were seldom above thirty, and sometimes not more than twenty-six. And though he seemed heavy and torpid, yet he could go out in a carriage, and walk about his garden, receive company, and eat with a tolerable appetite."

I have at this moment under my care a case of still greater anomaly, in which the pulse is never more than thirty, and more commonly, even after walking, not more than twenty-seven strokes in a minute. Mr. Alexander, the patient I refer to, is sixty-five years of age. About six years ago, from the bursting of a pipe for the conveyance of coal-gas, he fell down in a fit of asphyxy, from which he revived with great difficulty. The reducing plan was carried too far, and, though he has recovered from the accident, and his head is uniformly clear, he is dyspeptic, and subject to palpitations of the heart. [In September, 1828, a gentleman, named Paine, was confined in the Fleet prison, whose pulse was sometimes as low as thirty, and hardly ever above forty: he suffered a good deal from asthma.]

The pulse may be counted with great accuracy up to a hundred and forty, or a hundred and fifty in a minute; and if the stroke be equal, and the wrist slender, so that we can take in more than half the artery by the pressure of two fingers, we can reach a hundred and eighty; Professor Frank gives an instance of two hundred† in a case of complicated carditis; but, beyond this, there is great confusion and uncertainty; and it is difficult, therefore, to understand by what nice mode of measurement Dr. Wendt could distinguish, as he tells us he has done, a pulse of two hundred and forty-three strokes in a minute.‡ Sir John Floyer sets down a hundred and forty as the amount of "as many pulses as can be counted."§

The pulse is quickened by very slight excitements, both external and internal. The stimulus of the air, of the light, and of sounds, is sufficient to make that of an infant awake fifteen or twenty

* Med. Trans., vol. ii. art. ii. p. 29.

† De Cur. Hom. Morb. Epit., tom. ii. p. 175. 8vo. Manheim, 1792.

‡ De Mutatione quâdam Pulsus insigni. Erlang. 1778. V. Bald. Syll. v.

§ The Physician's Pulse-Watch; or an Essay to explain the old Art of feeling the Pulse, and to improve it by the Help of the Pulse-Watch. 2 vols. 8vo. Lond. 1707.

strokes more frequent than when it is asleep, and beyond their control. The pulse of an adult is usually quickened eight or ten strokes during the digestion of a meal; and running, or any sudden and rapturous emotion of the mind, will double the ordinary scale. The depressing passions, on the contrary, check it, and have sometimes put a total stop to the heart's motion, with a deadly shock, and killed the patient in a moment. There are many drugs that have a like tendency, of which all the simple narcotic poisons afford examples. The digitalis and hyoscyamus are expressly used on account of this property: the prussic acid, and the plants that contain it, as bitter almonds and the leaves of the *prunus lauro-cerasus*, when given in free doses, destroy the irritability, and extinguish the pulse instantly; and this so effectually that the heart, when immediately examined, has been insensible, not only to puncture, but to concentrated acids.

As the excitement of the stomach during the natural process of digestion is capable of accelerating the pulse eight or ten strokes in a minute, there can be no difficulty in conceiving, that it may be still more accelerated by a morbid excitement of any other large organ, and particularly where the primary seat of excitement is in the sanguiferous system itself. And as, generally speaking, the frequency of the beat is in proportion to the degree of excitement, the pulse becomes a sort of nosometer, or measurer of the violence and danger of the disease: and it measures it equally, whether the return of the beat be below the standard of health or above it.

How far, in either case, the pulse may vary from its natural number, without great danger, depends upon a multitude of collateral circumstances, as the age of the patient, his idiosyncrasy, the peculiar disease he is labouring under, and the strength or weakness of the system. And hence, in addition to the number of the pulse, we should also attend to its degree of fulness, softness, firmness, freedom, and regularity; a critical knowledge of which can only be learnt by experience and a nice discrimination.

It has been highly injurious, however, to the study of medicine, that this subject has been often too finely elaborated, and the variations of the pulse been ramified into so many divisions and subdivisions, and nice unnecessary distinctions, as to puzzle the young and be of no use to the old. And hence, some of the best pathologists of modern times have been too much disposed to shake off nearly the whole of the incumbrance, and pay no attention whatever to the pulse except in regard to its frequency. Amongst this number was Dr. Heberden:—"Such minute distinctions of the several pulses," says he, "exists chiefly in the imagination of the makers, or, at least, have little place in the knowledge and cure of diseases. Time, indeed, has so fully set them aside, that most of these names of pulses are now as unheard of in practice as if they had never been given."* And in forming, therefore, his prognostic of a disease, while he appeals to the pulse merely in respect to its number, he draws his other grounds of decision from the nature of the malady, and the violence of its specific signs.

II. Moving powers of the sanguineous system.

In like manner soon checked.

Sometimes stopped instantly.

How quickened by morbid excitements.

Hence the pulse a nosometer.

Other circumstances to be noticed in connexion with its quickness.

The doctrine often rendered too complicated.

* Med. Trans., vol. ii. p. 20.

II. Moving powers of the sanguineous system.

Sometimes too much simplified.

But this is to limit the subject to too strict a boundary; and to exclude ourselves from what, in many instances, are clear and even leading diagnostics. There are some practitioners, and of very high merit too, whose fingers are no more capable of catching the finer distinctions of the pulse, than the ears of other persons are the niceties of musical sounds. I suspect this was the case with Dr. Heberden, as it was also with the late Dr. Hunter; of whom Mr. John Hunter observes, that, "though he was extremely accurate in most things, he could never feel that nice distinction in the pulse that many others did, and was ready to suspect more nicety of discrimination than can really be found. Frequency of pulsation in a given time is measurable by instruments; smartness or quickness in the stroke, with a pause, is measurable by the touch, but the nicer peculiarities in the pulse are only sensations in the mind. I think," continues this distinguished physiologist, "I have been certain of the pulse having a disagreeable jar in it when others did not perceive it, when they were only sensible of its frequency and strength: and it is, perhaps, this jar that is the specific distinction between constitutional disease or irritation and health. Frequency of pulsation may often arise from stimulus, but the stroke will then be soft; yet softness is not to be depended on as a mark of health; it is often a sign of dissolution; but then there must be other attending symptoms."*

Strength and regularity, or weakness and irregularity, of the pulse.

Full and small pulse.

Hard and soft pulse.

Dr. Fordyce's table of the pulse is, perhaps, unnecessarily complicated; but the strength or weakness, fulness or smallness, hardness or softness, regularity or irregularity of the pulse, are indications nearly as clear as its frequency or slowness, and, in many cases, quite as diagnostic of the general nature of the disease. Frequency and slowness of the pulse, taken by themselves, indicate little more than the degree of irritability of the heart, or the force of the stimulus that is operating upon it. The strength and regularity, or weakness and irregularity of the pulse are as palpable to the finger as the preceding sign, and show, in characters nearly as decisive, the degree of vigour or debility of the heart; and, hereby, except where this organ is labouring under some local affection, the vigour or debility of the system, which a mere variation in the state of the frequency of the pulse will not tell us. A full and a small pulse may be distinguished with almost as much ease as any other property it possesses; this Mr. John Hunter ascribes to the state of the arteries: but, if I mistake not, it gives us rather a measure of the quantity of blood circulating through the system, than of the muscular strength of the arteries, or of the heart itself; which is often a very important indication, and especially when combined with the preceding signs; as it will then be our best guide in cases where we have determined upon emptying the vessels as far as we can do it without danger. Hardness and softness of the pulse, together with that vibratory thrill which has been called wiriness, are not quite so easily learnt as its fulness and smallness, but a nice finger will readily discriminate them, and practice will point out the difference to every one.† These characters

* On Blood, part ii. ch. iii. p. 318.

† If a pulse be exceeding *hard*, and at the same time *small*, then it has been called a *wiry* pulse; if a pulse be both *hard* and *large*, it is a *strong* pulse also;

Dr. Fordyce makes dependent, and, I think, with great reason, on the state of the arteries, rather than on that of the heart, or on the quantity of the circulating fluid; and Mr. John Hunter concurs in the same view. They measure the degree of vascular tone, or power of resistance; and when the same effect, whether above or below the natural standard, takes place in the capillary arteries, it produces that change in the pulse which he distinguished by the names of obstruction and freedom, but which it is not always easy to discriminate from several of the preceding qualities; nor is it of great importance, as we have in such cases other symptoms that more strikingly manifest the same fact.

II. Moving powers of the sanguineous system.

Obstructed and free pulse.

Thus, far, perhaps, the doctrine of pulsation may be studied to advantage: but when, beyond this, we come to a distinction between the free and dilated pulse, as proposed also by Dr. Fordyce; the quick and the frequent, as proposed by Stahl*; and the dicrotic, coturnising, and inciduus, proposed by Solano†, as mere subvarieties of the rebounding, or redoubling, itself a variety of the irregular pulse, we perplex pathology with a labyrinth in which the student is lost, and the master wanders to no purpose. "Infida," says Professor Frank, "arbitraria et æquivoca est multorum de pulsibus criticis doctrina."‡

Examples of the doctrine carried to an extreme.

Pulse of Solano.

De Bordeu acquired great reputation in the middle of the last century, for applying the doctrine of pulsation as an index to the diseases of every distinct organ of the body; whence he not only adopted most of the subdivisions of Solano, but added others, and subdivided them still further. He started it as a new hypothesis, which he endeavoured to support by facts and arguments, that every separate organ possesses a principle of life in some measure peculiar to itself, and independent of the rest of the frame; that each is endowed with a proper function, and susceptible of proper sensations and movements; and that, by the agreement and co-operation of all these distinctive powers, the life and health of the entire system are built up and maintained. These principles are developed and defended in his thesis, "De Sensû genericè considerato," published at Montpellier in 1742. Though arrogating the merit of originality, they are, however, little more than a revival of the ancient doctrine of harmony invented by Aristoxenus, and at one time very popular in Greece, as we learn from Lucretius:—

Organic pulses of De Bordeu.

On what founded.

—Multa quidem sapientum turba putarunt
Sensum animi certâ non esse in parte locatum;
Verùm habitum quemdam vitalem corporis esse,
'ÆFEMONIAN' Graiei quam dicunt.§

M. De Bordeu, in adopting this hypothesis, supposed, further, How applied.

if a pulse be *small* and *soft* together, then it must be considered as *weak*. See Elliotson's Lectures, delivered at the London University, pub. in Med. Gaz. for 1831-2, p. 141.

* De Differentiâ Pulsûs celeris et frequentis.
† Novæ Observationes circa Crisium Prædictiones et Pulsûs. Wetsch, Medicinæ ex pulsû. Vind. 1770. Vienn. 1773.

‡ De Curandis Hom. Morbis Epitome, tom. i. p. 30.
§ De Rer. Nat., lib. iii. 98. See the author's examination of this hypothesis, and its resemblance to others of later date, in the notes to his Translation of Lucretius, book v. 100. and 104.

II. Moving
powers of the
sanguineous
system.

that an affection of any particular organ will occasion a peculiar variation in the pulse from its natural state; and, by a careful attention to these changes, he conceived himself capable of ascertaining the seat of the disease, and the channel through which nature was aiming at a crisis. He describes, in consequence, an overwhelming multiplicity of *organic pulses*: but his general division is into superior and inferior pulses; and this he founds on an observation that the actions of the parts seated above the diaphragm, and of those below, excite very different impressions on the circulatory system. These views are chiefly given in the most famous of all his publications, entitled "*Recherches sur le Pouls, par rapport aux Crises.*" Paris, 1756. 8vo. This hypothesis became extremely popular in France and Germany, and excited a considerable degree of attention at Edinburgh. It is now, however, little heard of, and is by no means worth reviving.

In effect, a voluminous and complicated classification of pulses is rather a proof of an active fancy than of a sound judgment: and though Dr. Heberden and Dr. Hunter may have thought too lightly of this branch of pathognomy, it is better to adopt their simplicity than the puerile conceits of many more elaborate pulse-makers. The Chinese have a more operose system of pulsations than any that have appeared in Europe: but nothing can be more whimsical than their divisions, though Floyer fell in love with them, and thought them models of wisdom and accuracy. Avicenna treated of the pulse musically; and Hoffenuffer, pursuing his principles, drew up, in 1641, a musical scale of the pulse, dividing it into musical time, and marking the different beats by semibreves minims, and crotchets, semiquavers, and demisemiquavers; thus reducing his patient to a harpsichord, and his profession to a chapter on thorough-bass.

III. Intrinsic
properties of
the blood.

Its specific
gravity and
temperature.

Serum and
crassamentum.

Whether heat
is evolved
during the pro-
cess of coagu-
lation.

Fibrin.

III. [Blood, when first drawn from the vessels, is an adhesive fluid, of a homogeneous consistence, of the specific gravity of about 1.050, of a red colour in man and the higher animals, and of the temperature of about 98° in the human subject. Soon after its discharge from the vessels, if it be suffered to remain at rest, it begins to coagulate, and, as the process advances, it separates into two distinct parts, namely, a red mass floating in a yellowish fluid. The red part is called the clot, or crassamentum, and the fluid part the serum. The average time, requisite for the coagulation of venous blood, is said to be seven minutes; and the crassamentum has been estimated to amount to about one-third of the weight of the serum.* In the act of coagulation, it is generally believed that an evolution of heat takes place, though the point is yet a contested one, Dr. J. Davy's investigations† disagreeing with those on which the preceding doctrine is founded, and corroborating the view adopted by Mr. Hunter.

The coagulum, or clot, may be deprived of its red colour by repeated ablution in water; thus showing, as Dr. Bostock observes, that the colouring matter is only mechanically mixed with the substance left behind, called fibrin, and not chemically combined with it.

* See Bostock's *Physiology*, vol. i. p. 434.

† *Edin. Med. Journ.*, No. 95.

Many causes of sudden death have the curious effect of impeding the coagulation of the blood. This is exemplified in persons rapidly killed by lightning and electricity; a blow on the stomach, or injury of the brain; by the bite of a rattlesnake, and other venomous animals; by acrid vegetable poisons, like laurel-water; excessive fatigue; and even violent agitation of the mind. In the same cases, Mr. Hunter found* a singular coincidence between the want of coagulability in the fibrin of the blood and the loss of contractility in the muscles after death. The body is also disposed to putrefy with unusual quickness. Hence there appears some analogy, if not identity, between muscular contraction, and the coagulation of the fibrin of the blood; an opinion strengthened, as Dr. Bostock has observed, by the fact that the chemical composition of fibrin is similar to that of muscle. From the relation between the coagulation of the blood and the contractility of muscles, Mr. Hunter appears to have deduced his celebrated hypothesis of the life of the blood; a doctrine, which embraces the principle that a fluid is capable of organisation, and may be endued with functions either identical with, or very similar to, those which are the most characteristic of the living animal solid.*

At the temperature of 160°, the serum itself coagulates, from which a fluid, termed the serosity, may yet be obtained by pressure. The coagulated part is albumen, which principle exists also in the serosity, but is suspended by the presence of an alkali.

The coagulation of the blood is a circumstance, not only interesting to the physiologist, but a source of useful information to the medical practitioner; for certain appearances of the blood, after its coagulation, are a general indication of inflammation, or other disturbance in the system. Thus, when the upper stratum of the coagulum has a yellow buffy look, in consequence of the red globules having subsided from it; when its surface is more or less concave, and the quantity of serum in the basin copious; the blood is said to be *sizy*, and to exhibit the *buffy coat*, or *inflammatory crust*. As, however, the buffy coat frequently occurs, when no inflammation nor inflammatory fever exists, the state of the pulse and other symptoms should always be duly considered, and the decision for the further use of the lancet never be founded merely on the look of the blood, without reference to other circumstances in the case.]

To speak minutely of the CONSTITUENT PRINCIPLES OF THE BLOOD, would carry us too far into the regions of animal chemistry; and I shall hence limit myself to a very brief analysis of those that are fixed or confinable, having already paid some attention to the gases in the physiological proem to the preceding class.

For the first judicious account of these principles, we are indebted to an elaborate memoir of MM. Parmentier and Deyeux, who arranged them under the following heads:—1. A peculiar aroma, or odour, of which every one must be sensible who has been present at a slaughter-house, on cutting up the fresh bodies of oxen. 2. Fibrin, or fibrous matter, frequently also called coagulable lymph, and gluten. 3. Gelatine. 4. Albumen. 5. Red colouring matter. 6. Iron. 7. Sulphur. 8. Soda. 9. Water.

III. Intrinsic properties of the blood.

Causes preventing coagulation.

Serum coagulable by heat.

Serosity.

Albumen.

Buffy coat, or inflammatory crust.

Analysis of Parmentier and Deyeux.

* Bostock, vol. cit. p. 443.

III. Intrinsic properties of the blood.

Corrected by later experiments.

No gelatine in the blood.

Uncoagulable matter of Bostock.

Sulphur of the blood a component part of the albumen alone.

Iron of the blood a constituent of the colouring matter.

Analysis of Berzelius.

Blood composed of a suspending and a suspended part.

Liquid, or suspending part.

Still minuter and more exact experiments have since been made upon particular portions or the whole of the blood, especially by Dr. Marcet *, Dr. Bostock †, and Berzelius ‡, which confirm the greater part of the preceding results, but have detected a few errors, which it is necessary to notice.

Neither the blood of man, nor of quadrupeds, so far as they have been examined, contain any gelatine. "The mistake," says M. Berzelius, "arises from the gelatinous appearance of the albumen: I have never been able to detect a particle of gelatine in blood, and, as far as my researches extend, I have found gelatine to be a substance altogether unknown to the economy of the living body, and to be produced by the action of boiling water on cartilage, skin, and cellular membrane; substances which are totally distinct from fibrin and albumen." It follows, therefore, that wherever gelatine is found in the animal frame, it is produced by a decomposition and recombination of the particles of the blood by the action of the secretions. But, instead of the gelatine, Dr. Bostock has since discovered in the serosity, or that part which remains when the lymph or serum has parted with its albumen by heat, a distinct substance, which he has denominated from its quality, uncoagulable matter§, and which Dr. Marcet has called muco-extractive matter. Berzelius has affirmed it to be impure lactate of soda.

The sulphur, detected in the blood by Parmentier and Deyeux, does not exist in a free state, but is a component part of its albumen, as are also its carbon and hydrogen; which, in consequence, have as strong a claim to be considered as constituent principles as sulphur. It is by means of its constituent sulphur, that the albumen of blood, or of an egg, becomes capable of blackening a silver instrument employed to stir it.

The iron traced in the blood is, in like manner, a constituent principle of the red colouring matter, and exists in so intimate an union with it, that it cannot be detected by the best reagents we possess, till the composition of the colouring matter is totally destroyed by heat, or some other means.

With these explanations, we are now able to proceed to a clear comprehension of the following brief analysis of the blood, as corrected by the later experiments of Berzelius, supported by those I have just adverted to of Dr. Marcet and Dr. Bostock.

Blood is composed of two parts: one, homogeneous and liquid; and one, only suspended in the liquor, and spontaneously separating from it when at rest.

The homogeneous and liquid part consists of much albumen, and a little fibrin, both combined with soda, and all dissolved in water. It also contains a small portion of a few other saline and animal substances. ||

The suspended part consists of the colouring matter. It differs from albumen chiefly in its colour and its insolubility in serum.

* Trans. Medico-Chirurg. Soc., vol. ii. p. 370.

† Id., vol. i.

‡ Id., vol. iii.

§ Elementary System of Physiology, vol. i. p. 476. 8vo. 1824.

|| Dr. Stevens has endeavoured to prove, that the fibrin partly owes its fluidity within the body to its being held in solution by the saline substances contained in the serum; but, if this hypothesis were true, the fibrin, one would expect, ought not to be totally insoluble in solutions of neutral salts. It seems to be nearly contradicted, indeed, by one of Dr. Stevens's own experiments. "If, at a certain period after coagulation has commenced, we add muriate of soda, or a

Iron enters as a constituent ingredient into this material, in the proportion specified in the foot-note. It seems to be the colouring principle; but cannot be separated from it as long as it continues to be colouring matter. This separation can only be effected by combustion, or by the concentrated acids, both of which agents entirely decompose the substance with which the metal is combined. The iron exists in the form of oxyde, with a small proportion of subphosphate of the same. But the colouring matter cannot be artificially produced by uniting albumen with red subphosphate of iron.*

Fibrin, albumen, and colouring matter, have sometimes been considered as modifications of one and the same substance. Each of these three substances *yields*, when decomposed, but does not *contain*, earthy phosphates and carbonate of lime; for the entire blood holds in solution no earthy phosphate, except, perhaps, in too small a quantity to be detected.

From these earths it is clear, that the bones derive their earthy supply; which, however, it is also clear they can only do, as in the case of the formation of gelatine, in consequence of a decomposition of the blood as it arrives at the secernents of the bones.

Vauquelin endeavoured to separate the colouring matter from the blood by means of sulphuric acid; but, this does not very well answer the purpose. A method, proposed by Berzelius, is much simpler, as well as more effective.† It consists in placing the clot or coagulum of blood upon blotting paper, to get rid of the serum as completely as possible. The clot is then to be put into water, in which the colouring matter dissolves, while the fibrin remains unaffected; when, the water being evaporated, the colouring matter is obtained in a separate state. On reducing this matter to ashes, about 1·200 of iron can always be separated.

It is difficult to determine, by what means the iron, or the sulphur, or the elementary principles of calcareous earth, obtain an existence, or the means of existence, in the blood. If these materials were equally diffused throughout the surface of the earth, we might easily conceive, that they are introduced through the medium of food. But as this is not the case, some regions, like New South Wales, at least on this side the Blue Mountains, containing no limestone whatever, and others no iron or sulphur, while all these are capable of being obtained apparently as freely from the blood of the inhabitants of such regions, as from that of those who live in quarters, where such materials enter largely into the natural products of the soil,—it is perhaps most reason-

III. Intrinsic properties of the blood.

Colouring matter, or suspended part.

Earthy phosphates and carbonate of lime, how far existent in the blood.

How the bones are supplied with earthy materials.

Colouring matter, how separable.

Whence the iron, sulphur, &c. obtain an existence in the blood.

saline solution, to the coagulating blood, the moment that the fibrin feels the stimulus of the salt, the whole of it becomes suddenly solid; and," he adds, "I have seen the fibrin of inflammatory blood, which had been drawn during the hot stages of the marsh fever, contract, on the application of salt, with almost as much rapidity as the muscles, when we apply the same stimulus to the fibres in the living body." Stevens on the Blood, p. 183.

* According to M. Lecanu, blood contains peroxide of iron in the proportion of 2·100 in 1000·000. See Ann. de Chim. et de Phys., xlviii. p. 308. The colouring principle is termed *hæmatosine*, 100 parts of which, burnt in the open air, leaves 1·25 of ashes, containing 0·625 of oxide of iron, and 0·625 of carbonate and phosphate of lime, phosphate of magnesia, and subphosphate of iron, blended together. — Berzelius.

† Ann. de Chim. et de Phys., tom. v. p. 42.

III. Intrinsic properties of the blood.

Aggregate amount of iron in the blood of an adult.

Whether iron exists in any other part than the colouring matter.

What part the iron is intended to perform.

able to conclude, that they are generated in the laboratory of the animal system itself, by the all-controlling influence of the living principle.

What may be the aggregate quantity of any of these minerals in the mass of blood belonging to an adult, has not been determined with accuracy. The amount of the iron has been calculated by Parmentier and Deyeux, upon grounds furnished them by Menghini, at seventy scruples, or very nearly three ounces, estimating the average of blood in the vessels of an adult at twenty-four pounds, which is most probably something short of the mark.

Whether iron exists in any other part of the animal frame than the colouring matter of the blood, is in some degree doubtful. Vauquelin seems to have traced it in egg-shells and oyster-shells; and Mr. Brande thinks he has done the same in the chyle and in the serum, and this as largely as in the colouring matter of the blood, which, after all, he thinks, contains only a very minute quantity.* But these experiments are too indefinite, and by no means coincide with those of Berzelius, since confirmed by other chemists. If the experiments of Menghini may be relied upon, human blood contains a larger proportion of iron than that of quadrupeds; quadrupeds have more than fishes; and fishes more than birds.

But, though there can be no longer any question of the existence of iron as a constituent principle in the blood, we are in total ignorance of the part it is intended to perform. It is, perhaps, the colouring material, though, as I have already observed in the physiological proem to the preceding class, even here we are still very much in the dark, and are overwhelmed with contending hypotheses.† It is probable, that the red particles of the blood contribute to the strength of animals to whom they are *natural*, as conjectured by Mr. J. Hunter, and that the strength of such animals

* Phil. Trans., 1812, p. 112. For additional information, see Turner's Elements of Chemistry, and Lecanu's Exp. in Ann. de Chim. et de Phs. vii. 48.

† The theory of Dr. Stevens is, that the colouring matter of the blood is a peculiar animal substance, which has the property of striking a bright red dye with salt; and, as salt exists in the serum, that it is the cause of the red colour of arterial blood. The reader will find in the Med. Gazette for 1832-3, p. 881. some valuable observations and experiments on the causes of the colour of arterial and venous blood, by Mr. G. H. Hoffman. If these experiments can be depended upon, they prove, 1. That carbonic acid gas will blacken red colouring matter of blood, suspended in the serum. 2. That atmospheric air and oxygen will restore its red colour. 3. That carbonic acid gas does exist in venous blood. 4. That the air-pump is not competent to extract the whole of the gases with which the blood is impregnated. 5. That air or oxygen, without salt, will not redden black blood. 6. That salt, without air, will. 7. That blood, without salt, is black. 8. That blood, with excess of salt, and impregnated with carbonic acid gas, is also black, and that its red colour cannot be restored by air, oxygen, or a further addition of salt. 9. That pure oxygen gas will heighten the red colour of hæmatosine suspended in serum, and impregnated with atmospheric air. 10. That nitrogen gas does not possess a positive power to blacken red blood. 11. That carbonic acid and hydrogen gases do. 12. That on macerating the crassamentum in water for an hour and a half, salt is extracted from a stratum of the coagululum equal in thickness to that which may, while moistened with serum, be reddened for the same length of time by exposure to the air. Mr. Hoffman considers it highly probable, also, from the results of his investigations, that free oxygen gas does exist in arterial blood. These results tend, in the main, to support Dr. Stevens's theory of respiration; although it is admitted, that some links in the chain of evidence, necessary to establish it, are wanting.—Ed.

is in proportion, or nearly so, to their number. Yet such particles are never found in the blood of several classes of animals, as insects and worms; and in those in which they are found, they have often no existence in the commencement of life; for they are not discoverable in the egg of the chick, when the heart first begins to pulsate; nor are they, in any animals, pushed into the extreme arteries, where we must suppose the serum reaches. And hence, whatever their value, they cannot be regarded as the most important part of the blood, or as chiefly contributing to the growth and repair of the system.*

Various attempts have at different times been made to determine the form and measure the diameter of the corpuscles of the blood; but they do not seem to have been accompanied with very great success. Della Torre, by applying his microscope, detected the red particles, as he thought, to be flat circles or rings with a perforation in the centre; and Mr. Hewson ascribed to them the same shape, but represented them as hollow or vesicular, with a dot of red colouring matter in the centre instead of a perforation; so that, if his description could have been substantiated, they might literally have been regarded as the wheels of life moving on iron axles. Mr. Hewson's hypothesis, however, extended much farther; for, by a variety of plausible experiments, he persuaded himself, and many others also, that it is the office of the thymus and lymphatic glands to secrete and elaborate these vesicles, which are then carried by the lymphatics and thoracic duct to the arteries, and from the arteries to the spleen, which furnishes them with their coloured axles. Some of these physiological and microscopic *divertissements*, however, have been long overturned; while the general shape of the corpuscles has been gravely shewn by other exquisite analyses to be globular: the diameter of which, as measured by the microscopical experiments of M. Bauer, is 1·2000 part of an inch; a dimension, however, which has since been reduced by Captain Kater to 1·5000 part of an inch.† M. Bauer has also ascertained, as he thinks, that it is not the centre of the globule that is dotted, but its outline that is surrounded with colouring matter; so that, instead of being annular wheels with iron axles, they are spherular wheels with iron tires. It is somewhat singular that, in the revolution of science, M. Bauer's views are now sinking below the horizon, while those of Mr. Hewson are again ascending into notice: for the later experiments of M. Prevost have restored to the red corpuscles of the blood their flat circles and points; and divested them of a globular form. MM. Prevost and Dumas believe the colouring matter to be a membrane, by which these corpuscles are surrounded. They pursued a dexterous method of drying the red particles as soon as separated, and found that, when divested of this red matter and rendered colourless, they are of the same size in every animal they examined; being 1·7600 part of an inch; but that, with the colouring matter, the size differs in different animals; being 1·3100 of an

III. Intrinsic properties of the blood.

Form and diameter of the red particles of the blood.

Hewson's hypothesis:

long since overthrown.

Bauer's microscopic experiments.

Experiments of Dumas and Prevost.

* On Blood, pp. 46. 48.

† Phil. Trans., 1818, pp. 173. 187. Dr. Hodgkin, who has carefully examined the red particles of the blood with a microscope, denies that they are globular; and his description of them is different from that given of them by other experimenters. See Catalogue of Anatomical Museum of Guy's Hospital, Obs. on sect. XI.—ED.

III. Intrinsic
properties of
the blood.

inch in man, the dog, rabbit, pig, guinea-pig, and hedgehog; in the ass, 1·4200; the cat and man, 1·4300: the sheep, horse, mule, and cow, 1·500; and the goat, 1·700. These particles have a peculiar tendency to form themselves into lines, as observed by Sir E. Home; the lines resembling in every respect the muscular fibre. Fibrin they found also to be a collection of colourless corpuscles of the same kind as the above: the same corpuscles may be also traced in the white of the egg. Those of a chick, six days after incubation, they found larger than those of a hen; as also, that those, which in some young animals are circular, afterwards become elliptical.* Even this last was also observed by Hewson; and the remarks may lead to some facts connected with inflammation, by which they may be influenced; as they may be likewise by the temperature of hot climates.

Alleged
development
of the globules.

According to a later set of experiments by M. Bauer, the fluid of the blood has a tendency to run into globules from the first and simplest stage of its formation; while, as it becomes more elaborated, the globules assume a larger and apparently a firmer form, till they at length become tinged with the red colouring matter. We have hence three distinct orders of globules; the first and minutest of which show themselves in the mesenteric glands, and perhaps in the lacteals, white in colour, and floating in a clear, perfectly colourless fluid. The second and middle orders consist of globules, void of colour, found floating in the serum, and which Sir Everard Home has called lymph-globules, and conceives to be the material chiefly thrown out in the process of inflammation. The third and largest order is that of the red globules, the colouring matter of which he supposes to be derived from the changes that take place in the act of respiration. But, though the great mass of the globules, found in the lacteal glands, are of the extreme minuteness just described, he observed that many of them were much larger; that about eight tenths varied from the smallest speck to the size of the lymph-globules; that about one tenth were of the size of red globules deprived of the colouring matter; and about one twentieth of the size of the red globules with the colouring matter encasing them. And he is hence inclined to think, that the lacteal glands are the cradle, in which the whole receive their form and structure, however elaborated by other combinations afterwards.

Real difference
between the
blood of differ-
ent species
undetected.

The subject, however, even upon these points, calls for much further attention†; and we have also still much to learn, not merely in respect to the real difference between human blood and that of quadrupeds, but the real difference between that of any one species of animal and any other. M. Berzelius observes that “the great agreement in the composition of human and ox blood is remarkable, and explains to us the possibility of the phenomena observed in the experiments in transfusion.” But we have a clear proof, that the blood of one species of animals differs so much from that of another, either in its principles or their modification, that no benefit can result from transfusion, unless from

* *Annales de Chimie*, in loco.

† These accounts of M. Bauer's investigations were found amongst Dr. Good's MSS. subsequently to the publication of the third edition of this work, with the place for their intended insertion in it marked by the author himself. — Ep.

like kinds to like kinds. Thus, according to several interesting experiments of Dr. Blundell, a dog, asphyxiated by hemorrhage, may easily be recovered by a transfusion of blood from another dog, but is little or not at all relieved, if the blood be taken from man *; and the experiments of MM. Prevost and Dumas precisely coincide with this doctrine.

[In the operation of transfusion, which seems to have been invented, or, at least, perfected by Lower about 1660, the artery of one animal is connected by a tube with the vein of another animal, under which circumstances the first is gradually deprived of its blood, and the second rendered plethoric. If an opening be made in the veins of the latter, its original blood will escape, and be replaced by that of the other animal. At the time when these experiments were made, diseases were supposed to depend upon morbid qualities in the blood; and as transfusion held out the prospect of changing this fluid at pleasure, it was hailed as a most important means of restoring the health, and some individuals actually submitted to have the blood of lambs or calves transmitted into their vessels, for the purpose of being cured of certain diseases, or of having their vigour renovated.† The first experiments performed on the human subject ended fatally; and in France the continuance of the practice was prohibited by law. Dr. Blundell, however, has established the important fact, that the blood of an animal of the same species may be safely transfused; but, that if the blood of a different kind of animal be employed, great disorder of the functions is occasioned, and death generally ensues. With strict attention to this principle, the experiment has now been tried upon the human subject in several instances, and occasionally with decided success.]

Upon the whole, we cannot but regard the blood as, in many respects, the most important fluid of the animal machine: from it all the solids are derived and nourished, and all the other fluids are secreted; and it is hence the basis or common pabulum of every part. And, as it is the source of general health, so it is also of general disease. In inflammation, it takes a considerable share, and evinces a peculiar appearance. The miasms of fevers and exanthems are harmless to every other part of the system, and only become mischievous when they reach the blood; and emetic tartar, when introduced into the jugular vein, will vomit in one or two minutes, although it might require, perhaps, half an hour if thrown into the stomach, and, in fact, does not vomit till it has reached the circulation. And the same is true of opium, jalap, and most of the poisons, animal, mineral, and vegetable. If imperfectly elaborated, or with a disproportion of some of its constituent principles to the rest, the whole system partakes of the evil, and a diathesis or morbid habit is the certain consequence; whence tabes, atrophy, scurvy, and various species of gangrene. And if it become once impregnated with a peculiar taint, it is wonderful to remark the tenacity with which it retains it, though often in a state of dormancy or inactivity, for years or even entire generations. For, as every germ and fibre of every

III. Intrinsic properties of the blood.

Transfusion.

Blood, in many respects, the most important fluid of the animal frame:

acted upon by external bodies, volatile and concrete.

When imperfect, the great source of morbid habits.

Transmits mental and corporeal taints to subsequent generations.

* Trans. Medico-Chir. Soc., vol. ix. p. 86.

† See Bostock's Physiology, vol. i. p. 348.

III. Intrinsic properties of the blood.

Dr. Armstrong's opinion on this subject.

Alterations of the blood in disease.

other part is formed and regenerated from the blood, there is no other part of the system that we can so well look to as the seat of such taints, or the predisposing cause of the disorders I am now alluding to ; often corporeal, as gout, struma, phthisis ; sometimes mental, as madness ; and occasionally both, as cretinism.

[Whether the blood be primarily affected in certain diseases, or chiefly concerned in the transmission of what have been considered hereditary disorders, as the author has conjectured, are questions very difficult to solve ; and the doctrine, if carried too far, would be at variance with some well-established facts, and approved theories, which ascribe the first origin of many complaints rather to an affection of the blood-vessels, absorbents, or nerves, than to a change of the blood itself. It must not be inferred, however, that, in disease, this fluid is not subject to alteration ; a fact, of which the valuable observations of Dr. Armstrong furnish convincing evidence ; nor even that it may not be sometimes the primary vehicle of disease into the constitution. Passing over the variations which occur in its quantity, velocity, and distribution, subjects on which this able physician has offered many judicious and practical reflections, let us attend to what his experience has taught him respecting the altered qualities of the blood in cases of disease. It differs, he says, in different persons, and even in the same person under different circumstances. In general, plethora takes place either in strong individuals of firm fibre, or in plump lax persons. In both cases, there is a superabundance of the red portion of the blood, but the crassamentum is much firmer in the former subjects, than the latter. On the contrary, when local plethora affects the mucous textures of pale thin men, relaxed by sedentary habits and a spare slop diet, the red particles are often deficient, and the quantity of fibrin and albumen lessened. A similar effect is well known to result from copious and repeated blood-letting, the blood becoming thinner and thinner, and the skin paler and more flabby, than natural. Indeed, says Dr. Armstrong, the blood is brought into a like condition by protracted disorder, especially where the digestive processes are disturbed, as in cases of chlorosis, in some of which he has known the blood flow from the punctured vein, like so much thin claret, or very pale red ink. Nor are the red particles alone affected ; for, when rich blood shows the buffy coat on coagulating, it is firm, opaque, and striated generally on the surface ; whereas, in poor blood, it is loose and semi-opaque, like so much ill-strained jelly ; appearances unequivocally revealing that the fibrin itself is more or less altered. In several cases where the circulation was much increased in force and frequency, Dr. Armstrong has seen the blood gush from an opened vein with the bright vermilion colour of arterial blood ; while, on other occasions, where its course had been impeded or retarded in the small arteries, it exhibited a dark venous character. In some examples of fully developed typhus, where the tongue was glazed, dry, and brown, and the lips and cheeks of a dusky or purple hue, he has seen the blood from the temporal artery present a venous colour. The circulation of such blood within the arteries, seems to Dr. Armstrong to be connected with many of the most conspicuous phenomena of the advanced stage of genuine typhus, and dependent upon a specific bronchitis, in which the mucous texture

of the bronchial tubes is loaded with dark blood, and smeared with a copious and tenacious secretion. The contagions of small-pox, measles, and scarlatina, he says, first operate on the blood, after which the solids are specifically affected, especially the skin and mucous membrane of the air passages. In specific fevers, where the venous blood is not duly converted into arterial from the presence of bronchitis, that fluid emits an unpleasant odour, not unlike the smell of bugs. The blood of those who live on animal food has more azote in it, than the blood of persons who live on vegetables. A diet of salted meat likewise produces a change in the blood, as illustrated in cases of sea-scurvy. The circulation of extraneous substances in the blood appears to Dr. Armstrong to be a frequent cause of fever, as he has ascertained to be the fact in relation to mercury. Mental derangement he also conceives may sometimes be connected with a morbid state of the same fluid.* From a case reported in the *Lancet*, No. ccxxxviii. p. 909., it would appear that, in diseases of the spleen and liver, the blood may even acquire an acid quality.]

As already noticed, the blood has been supposed to be alive; a belief of very high antiquity, and which has been warmly embraced by Dr. Harvey and many others of the first physiologists of modern times. It was a favourite opinion of Mr. John Hunter, and runs through the whole of his doctrines. "That the blood," says he, "has life, is an opinion I have started above thirty years, and have taught it for near twenty of that time in my lectures. It does not, therefore, come out at present as a new doctrine; but has had time to meet with considerable opposition, and acquire its advocates. To conceive that blood is endowed with life while circulating, is, perhaps, carrying the imagination as far as it well can go; but the difficulty arises merely from its being a fluid, the mind not being accustomed to the idea of a living fluid."†

The experiments and train of reasoning he urges in favour of this opinion, are highly ingenious and peculiarly strong. And, though they may not be demonstrative of a vital and energetic essence separate from the blood itself, but inherent in its substance, and controlling its motions, they seem very clearly to show, that the blood is endowed with peculiar powers; and that, as matter at large is subject to the laws of gravitation, so the matter of the blood is subject to the laws of instinct. We may here add, in favour of Mr. Hunter's opinion, the following two corollaries of Dr. Philip, deduced from a large field of experiments. "The power of the blood-vessels, like that of the heart, is independent of the nervous system.—The blood-vessels can support the motion of the blood after the heart is removed."‡

Admitting these deductions to be established, the power here referred to, and capable of influencing the blood or the blood-vessels, separately from that of the heart and of the nervous system, must be the power of simple life, or of instinct, which is simple life operating by the exercise of its own laws.

This view of the subject has of late, however, been carried by Dr. Pring to an extent far beyond what Mr. Hunter at any time

III. Intrinsic properties of the blood.

Hence supposed to be alive.

As taught, especially, by Mr. J. Hunter.

Influenced by the laws of instinct.

Instinct simple life operating by the exercise of its own laws.

Living principle, according to Pring, in morbid secretions and animal poisons.

* See Armstrong's *Morbid Anatomy of the Bowels*, &c. p. 6. 4to. Lond. 1828.

† On Blood, p. 77.

‡ Phil. Trans., 1815, p. 445.

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properties of
the blood.

contemplated. For Dr. Pring not only supposes the blood to be alive, and to communicate life to the sentient and healthful parts of the system, but to its insentient and diseased elements as well; and that the matter of animal poisons, derived from the blood, are themselves also living bodies, acting specifically by the vital but discrepant properties they are endowed with. And he thinks that hereby "a distinction may be furnished between the contagious and infectious diseases." *

* Principles of Pathology and Therapeutics, &c. By Daniel Pring, M.D.
8vo. 1823.

CLASS III.

HÆMATIC A.

ORDER I.

PYRECTICA.

FEVERS.

HEAT AND NUMBER OF THE PULSE PRETERNATURALLY AUGMENTED: USUALLY PRECEDED BY RIGOR, AND FOLLOWED BY PERSPIRATION: DURING THE RIGOR, PAINS FIXED OR WANDERING: LASSITUDE: DEBILITY OF MIND AND VOLUNTARY MUSCLES.

No complaint is so common as fever; none in which mankind, whether professional or laical, are so little likely to be mistaken, and yet none so difficult to be defined. In reality, no writer seems to have been fully satisfied with his own definition; and it is not extraordinary, therefore, that he should seldom have given satisfaction to others. The difficulty proceeds from the complexity of the symptoms that enter into the character of a fever; the contrariety of many of them to each other in different stages of it; and the occasional absence of some that, in other instances, appear to constitute its leading features. "Febris," says Professor Frank, "*certorum potius morborum UMBRA, quam ipse morbus est.*"*

The nosologist has also two other difficulties of considerable magnitude to contend with in laying down a clear and perspicuous survey of fevers; and that is, their division or collocation, and their generic names. But, as I have already pointed out these difficulties, and the means by which they are attempted to be remedied under the present arrangement and nomenclature, in the running commentary to the Order before us in the volume of Nosology, I shall beg to refer the reader to the observations there laid down, and shall subjoin only one or two additional remarks upon the same subject.

Although the number of the pulse, as well as the heat, is preternaturally augmented in almost every case of fever, an extraordinary instance is sometimes to be met with, that opposes the

CLASS III.
ORDER I.
Difficulty of
defining fever.

Difficulty of
fixing divisions
and generic
names.

Heat and pulse
not always aug-
mented in
fever.

* De Curand. Hom. Morb., Epit. i. p. 2. tom. iv. 8vo. Mannh. 1792. "The word *fever*, derived from the Latin term *febris* (a derivative of the verb *ferveo*, signifying, to be hot), is applied to a class of diseases, characterised by morbid heat of the skin, frequency of pulse, and disturbance in the various functions." Dr. Tweedie, in Cyclop. of Pract. Med., art. FEVER.

ORDER I.
Pyrectica.

general law, for the most part dependent, I believe, on a great and sudden oppression of the brain; an explanation which withdraws the anomaly, and accounts for the ordinary increase of pulsation as soon as such oppression is removed. Thus, in the yellow fever of Antigua in 1816, the pulse, as Dr. Musgrave informs us, was, in one instance, under forty-four. "We almost fancied," says he, "this unusual softness might be constitutional: but, on opening a vein, it greatly increased in frequency; and, after the loss of a considerable quantity of blood, it numbered eighty, with nearly complete relief from every uneasy sensation."*

In such cases, the heat of the system usually exhibits as little febrile augmentation as the pulse: for, as the former is the result of increased action, till such increased action takes place, the heat, as in the first stage of the paroxysm, may continue even below the natural standard. Ordinarily, however, the heat is considerably heightened, in some instances to reach 108° Fahrenheit, which, however, is the utmost point it has ever been known to attain in fever.

Instance of hot
fit preceding
cold.

There is a still more curious variation from the general law, which is sometimes, though very rarely, found to take place, of which Schenck gives a single example that occurred in his own practice; I mean, a reversed order of the symptoms of the febrile paroxysm, and an appearance of the sweating stage before the shivering and hot fit.†

To provide for these extraordinary and anomalous incidents by any definition whatever, is beyond the power of language. They must be left to themselves, and will rather confirm than disturb the definition now offered, agreeably to the maxim of the Schools — *exceptio probat regulam*.

Principle
adopted by the
author in lay-
ing down the
genera of
fevers.

In dividing fevers into distinct genera, I have taken the line of demarcation from the character of their duration, as limited to a single paroxysm; as composed of numerous paroxysms, with intervals of intermission or perfect apyrexia; as composed of numerous exacerbations, with intervals of remission, or imperfect apyrexia; and as composed of a single series of increase and decrease, with a mere tendency to intervals of remission, without perfect apyrexia at any time. Other nosologists have drawn their generic distinctions from other circumstances; as their disposition or indisposition to putridity; their inclination to a sporadic or an epidemic character; the vigour and violence, or weakness and debility, of their action; or, in the language of Dr. Darwin, the nature of their influence on the sensitive or irritative fibres of the animal frame. The most obvious mark, however, and that which has been most generally approved, is the character of duration assumed in the arrangement before us. To all the rest, there are greater or less objections, which, as I have already examined them in the comment just referred to, need not be repeated in the present place.

Compared with
former princi-
ples.

Regulated, therefore, by the principle before us, fever admits of the four following genera: —

- | | |
|----------------|---------------------|
| I. EPHEMERA. | DIARY FEVER. |
| II. ANETUS. | INTERMITTENT FEVER. |
| III. EPANETUS. | REMITTENT FEVER. |
| IV. ENECIA. | CONTINUED FEVER. |

* Trans. Med. Chir. Soc., vol. ix. p. 133.

† Lib. vi. obs. 34.

To each of these belong several species, and to most of the species several varieties, as will be noticed in their respective order.

ORDER I.
Pyrectica.

Some slight deviation from the ordinary nomenclature may be observed in the generic names above: but the reader can have no difficulty upon this head, as he will find the changes that have hereby been occasioned are in every instance founded upon a principle of correctness and simplification; and consequently calculated to disentangle rather than to add to his incumbrances, and to facilitate his progress in the labyrinth before him. The term *Ephemera*, is, indeed, well known to every one. *Anetus* and *Epanetus* are Greek terms, importing intermittent and remittent, from ἀνότης and ἐπανότης. *Enecia*, from the same tongue, denotes continued action, and is a derivation from ἡνεκία.

Ordinary nomenclature slightly deviated from.

Before, however, we enter upon the practical part of this subject, it appears necessary to make a few remarks upon one or two other questions that have very largely occupied the attention of many pathologists, and especially concerning the proximate and remote causes of fever; and the tendency, which fever has been supposed to evince, of terminating suddenly, either favourably or unfavourably, at fixed periods of its progress.

Preliminary inquiries necessary to be noticed.

Proximate and remote causes are rather terms of recent, than of ancient writers. In early times, the causes of diseases chiefly contemplated were PROEGUMENAL or predisponent, and PROCATARTIC or occasional. Thus, an hereditary taint, or habitual indulgence in high living, may be regarded as a proegumenal cause of gout; and catching cold, or an unusual exertion of muscular exercise, may form its procatactic cause: both of which are absolutely necessary; for, it is clear, that the latter without the former would not produce the malady; and it is just as clear, that the former might remain harmless in the constitution for years, were it not to meet with the co-operation of the latter, which is often, on this account, denominated an exciting cause. Generally speaking, the first was regarded as an internal, and the second as an external cause; and, in the instance selected, they are so; but, they are not so always.

Morbid causes of diseases various.

Proegumenal cause, what.

Procatactic, what.

Exciting cause, what.

To be acquainted with causes of these kinds is always useful; and, in guarding against the approach of diseases, it is often of the utmost importance: but they give us very little information upon the real nature of diseases, and the mode of managing them when present. And hence another set of causes have been adverted to, and have of late been chiefly studied, and particularly in the case of fever. "That only," says Gaubius, "deserves the name of a physical cause, which so constitutes the disease, that, when present, the disease exists; while it continues, the disease continues; when changed or removed, the disease is altered or destroyed." It is this which constitutes the PROXIMATE cause, and is, in fact, the essence of the disease, the actual source of all its effects. The REMOTE cause is that, which directly produces the proximate; as, a specific virus in syphilis, or a specific miasm in influenza, or epidemic catarrh.

Proximate and remote causes, what.

In fever we can often trace the remote causes, though we are still too little acquainted with the nature of several of them to be able to restrict them to a specific mode of action: of the proximate

ORDER I.
Pyrectica.

Proximate
cause has given
rise to various
speculations.

Humoral a
nervous pa-
thology.

Chief hypo-
theses that have
been offered
upon the sub-
ject of a prox-
imate cause.

I. Hypothesis
of concoction :
doctrine of the
Greek schools.

Proximate
cause.

Extent of its
range.

cause, we know but very little at present, and it will probably be long before we shall know much more.

Let us, however, begin with the PROXIMATE CAUSE as that, which has most excited the attention of physicians in all ages. Upon this subject, indeed, a great deal of learned dust has been raised, and a great deal of valuable time consumed. Ancient speculations, for they are not entitled to the name of theories, have been overthrown; and modern speculations, in vast abundance, erected upon their ruins; which, in rapid succession, have also had their day and expired. It is an inquiry, therefore, not likely to prove very productive; yet, as forming a part of medical science, of which no student should be altogether ignorant, it seems necessary to take a brief survey of the most popular doctrines which have been advanced upon the subject in different ages.

Fevers, then, in respect to their proximate cause, have been conjectured to originate from a morbid change, either in the composition of the blood, or in the tone or power of the living fibre. The first view has given rise to various hypotheses, that rank under the common division of the HUMORAL PATHOLOGY. The second has given rise to other hypotheses, appertaining to the common division of the FIBROUS OR NERVOUS PATHOLOGY.

The hypotheses, derived from the one or the other of these sources, that are chiefly entitled to attention, are the following; of which the first two belong to the former division, and the remainder to the latter.

I. That of the Greek schools, founded on the doctrine of a concoction and critical evacuation of morbid matter.

II. That of Boerhaave, founded on the doctrine of a peculiar viscosity, or lentor of the blood.

III. That of Stahl, Hoffman, and Cullen, founded on the doctrine of a spasm in the extremities of the solidum vivum, or living fibre.

IV. That of Brown and Darwin, founded on the doctrine of accumulated and exhausted excitability, or sensorial power.

V. To which we may add, that fevers have, by some physiologists, as Dr. Clutterbuck, M. Broussais, and Professor Marcus, been identified with inflammation; and their proximate cause been ascribed to increased action in some particular organ.

I. It was the opinion of Hippocrates, that fever is an effort of nature to expel something hurtful from the body, either ingenerated, or introduced from without. Beholding a violent commotion in the system, followed by an evacuation from the skin and kidneys, with which the paroxysm terminated, he ascribed the commotion to a fermentation, concoction, or ebullition, by which the noxious matter was separated from the sound humours; and the evacuation to a despumation or scum which such separation produces, or rather to the discharge of this morbid scum from the emunctories that open externally. Galen supported this view with all the medical learning of his day; and it is the only explanation of fever to be met with in medical writings, through the long course of three thousand years; in fact, till the time of Sydenham, who still adhered to it, and whose pages are full of the language to which it naturally gave birth.

It blended itself almost immediately with the dialect of the chemists of the day, notwithstanding the professed hatred of Paracelsus and Van Helmont towards the whole range of Galenic doctrines, and the solemn pomp with which the former had condemned and burnt the entire works of Hippocrates and Galen. And hence, under the influence of chemistry, at this time assuming a soberer aspect, the supposed animal despumation was contemplated as possessed, according to different circumstances, of different chemical qualities and characters; and particularly as being acid, alkaline, effervescent, or charged with some other acriminous principle, too highly exalted, or in too great a proportion.

This doctrine, considered merely hypothetically, is not only innocent, but highly ingenious and plausible. It is in unison with several of the phenomena of pyretic diseases, and derives a strong collateral support from the general history of exanthems, or eruptive fevers, in which we actually see a peccant matter, producing general commotion, multiplying itself as a ferment, and, at length, separated and thrown off at the surface by a direct depuration of the system.

There is no writer, perhaps, in our own day, who has carried this view of the subject farther, or even so far, as Professor Frank, who regards typhus, plague, petechial and all pestilential fevers, and, indeed, nervous fevers of every kind, whether continued or remittent, not only as proceeding from specific contagions in the same manner as exanthems, but from contagions producing a like leaven in the system, and matured and thrown off through the various outlets of the body, by the same process of depuration; and hence, after describing all the varieties of malignant nervous fevers under the character of pestilential, he tells us, "*non aliter hæc methodus in ipsâ PESTE tum in PESTILENTIALI, sic vocatâ, febre, profuisse visa est: ubi, maturo satis tempore, CONTAGII PER CUTEM EXPULSIO sollicitè à medentibus absolvebatur.*"*

So far, however, as relates to exanthems, the opinion is sufficiently correct. But, the moment it is brought forward as the proximate cause of fever, properly so called, in which there is no specific eruption, it completely fails.

For, first, no explanation is here given as to the means by which any such concoction or fermentation, or multiplication of morbid matter in any way, takes place. Next, there are many fevers produced evidently by cold, fear, and other excitements, as well mental as corporeal, in which most certainly there is no morbid matter introduced, and wherein we have no reason to conceive there is any generated internally; while the disease, limited, perhaps, to a single paroxysm, closes, nevertheless, with an evacuation from the skin, or the kidneys. And, thirdly, we sometimes behold fevers suddenly cured, as Dr. Cullen has observed, by a hemorrhage so moderate, as for example a few drops of blood from the nose, as to be incapable of carrying out any considerable portion of a matter diffused over the whole mass of the blood; while we are equally incapable of conceiving how such diffused morbid matter could collect itself at a focal point, or pass off at a single outlet; or of tracing in the discharge, after the minutest examination, any properties different from those of blood in a state of full health.

ORDER I.
Pyretica.
Proximate
cause.

Blended with
the chemistry
of the day.

I. Doctrine of
concoction.

Highly ingenious
and partially
correct.

How far carried
by Frank.

In what respect
incorrect.

* De Cur. Hom. Morb. Epit., tom. i. p. 130. compare with the § p. 127.

ORDER I.
Pyrectica.
Proximate
cause.

Sometimes
followed by
an injurious
practice.

II. Lentor in
the blood, or
doctrine of
Boerhaave.

Whence de-
rived.

How applied.

Error loci,
what.

Medical no-
menclature
hence influ-
enced.

I have observed that this hypothesis is, however, harmless enough when merely brought forward as a speculation. But it has not always been limited to this point; for it has occasionally been advanced as a practical and efficient principle; and the febrile commotion, and particularly the hot fit, has, in treating the disease, been purposely increased, with a view of assisting nature in her curious but unknown process of expelling the peccant material, and the most dangerous consequences have followed.

II. The acute and penetrating mind of Boerhaave, who was born in 1668, was sufficiently sensible of this danger; and the discoveries, which were now taking place in chemistry and physiology, led him progressively to the construction of a new theory, which in a few years became so popular as to obtain a complete triumph over that of the Greek schools.

Leeuwenhoeck, by a delicate and indefatigable application of the microscope to animals of a transparent skin, had endeavoured to establish it as a fact that the constituent principles of the blood consist of globular corpuscles; but, that these corpuscles differ in size in a regular descending series, according to the constituent principles themselves; and that each set of principles has its peculiar blood-vessels, possessing a diameter just large enough to admit the globules that belong to it, and consequently incapable, without force, of allowing an entrance to those of a larger magnitude; and, hence, that the blood-vessels possess a descending series as well as the particles of the blood.

It was upon this supposed fact that Boerhaave built his hypothesis. He conceived that almost all diseases may be resolved into an introduction of any given series of particles of blood into a series of vessels to which they do not properly belong, and he distinguished such introduction by the name of *error loci*. He conceived, still further, that this heterogeneous admixture is very frequently taking place; and that its chief cause consists in a disproportion of one or more sets of the sanguineous principles to the rest, by which their globular form is occasionally broken down or agglutinated; and hence rendered too thin and serous, or too gross and viscid. The viscosity of the blood he distinguished by the name of LENTOR; and to a prevalence of this lentor, or viscosity, he ascribed the existence of fever; maintaining, that the general disturbance which constitutes fever proceeds from an ERROR LOC of the viscid blood, whose grosser corpuscles, from their undue momentum as well as superabundance, press forcibly into improper series of vessels, and stagnate in the extremities of the capillaries, whence the origin of the cold stage, and consequently of the stages that succeed it, to which the cold stage gives rise*; and hence those medicines which were supposed capable of dissolving that tenacity, or breaking down the coalescence of such a state of the blood, were denominated DILUENTS, HUMECTANTS, and ATTENUANTS, whilst those of an opposite character were called INSPISANTS: terms which have descended to our own day, and are still retained, even by those, who pay little attention to the hypothesis that gave them birth.

* Aph. 756. Comment. Van Swiet., tom. ii. p. 528. edit. Lugd. Bat. 4to. 1745.

The system of Boerhaave, therefore, consisted of an elegant and artful combination of both the earlier and later doctrines of corpuscular physiology. Without deserting the humoral temperaments of Galen, or the constituent elements and elective attractions of the alchemists, he availed himself of the favourite notions of the corpuscular pathologists, their points or stimuli, their frictions, angles, and spherules, derived from the Cartesian philosophy, which was now exercising as triumphant a sway over the animal as over the material system, and interwove the whole into an eclectic scheme, so plausible and conciliatory, that all parties insensibly felt themselves at home upon it, and adopted it with ready assent. In the emphatic language of M. Quesnay, it was "LA MÉDECINE COLLECTIVE."

The most triumphant fact in favour of the Boerhaavian hypothesis is, that the crust in the blood in inflammations, and cauma or inflammatory fever, is often found peculiarly dense. But, as fevers (and certainly the greater number) are found without any crust; and, as a similar crust, though, perhaps, not quite so dense, exists under other and very different states of body, as in pregnancy and scurvy (porphyra), even this leading appeal has long lost its power of conviction: whilst the abruptness with which fevers make their assault, from sudden occasional causes, and in constitutions of every diversity, forbid the supposition that, in such cases, a lentor or sisy crasis of the blood, and especially a *glutinosum spontaneum*, can have time to be produced, however it may exist occasionally, and be, perhaps, the source of other disorders. The subject, however, has of late been again taken up by Dr. Storker of Dublin, with a view of reviving the humoral pathology in its more important doctrines, and of extending the arguments which have hitherto been urged in its favour.*

ORDER I.

Pyrectica.
Proximate
cause.

II. Lentor in
the blood.

An elective
system, combining parts of
many others.

Fact in favour
of the hypo-
thesis, but
unavailable.

III. To the period of Boerhaave, in the production of fever and, indeed, of all other diseases, the human body was regarded as almost entirely passive, a mere organic machine, operated, indeed, upon by some AUTOCRATEIA, as NATURE, or a VIS MEDICATRIX, but in the same manner as other machines, and mostly by similar laws. Its muscles were contemplated as mechanical levers, and its vessels as hydraulic tubes, whose powers were calculated upon the common principles of mechanics and hydrodynamics, and were only supposed to be interfered with by the internal changes perpetually taking place in the fluids they had to convey. A new

III. Spasm of
the extreme
vessels, or doc-
trine of Stahl,
Hoffman, and
Cullen.

* Pathological Obs., &c. Dublin, 8vo. 1823. See also Armstrong's Morbid Anatomy of the Bowels, &c. p. 6. et seq. 4to. Lond. 1828; and Dr. Clanny's Lect. on Typhus Fever. According to Dr. Stevens's investigations, when the bodies of persons who died of yellow fever were opened, the heart was found to contain, instead of blood, a dissolved fluid, nearly as thin as water, and as black as ink. In both sides of the heart the fluid was equally black, and throughout the vascular system all distinction between venous and arterial blood was completely lost. Dr. Stevens thinks that the blood first loses its solid parts, and becomes thin; that it then becomes deprived of its saline principles, and turns black and vapid; and lastly, that it loses its vitality, so as to become incapable of supporting life. He regards this diseased state of the blood as the first link in the chain of morbid phenomena which constitute fever, and believes that the aerial poisons, from which all pestilential diseases arise, are attracted with the atmospheric air into the circulation, mix directly with the blood in the pulmonary system, and this poisoned or diseased state of the circulating blood is the cause of the subsequent morbid action in the solids. — Ed.

ORDER I.
Pyrectica.
Proximate
cause.

III. Spasm of
the extreme
vessels.

Era and pro-
gress of Stahl.

Explanation of
his hypothesis.

Followed up
and improved
by Hoffman.

Hoffman's
hypothesis,
how distin-
guished from
Stahl's.

Ingenuousness
of Boerhaave.

Ingenuousness
of Gaubius.

era, however, at length began to dawn upon the world; a more comprehensive spirit to pervade medical study: the animal frame was allowed to exhibit pretensions superior to the inanimate, and not only to be governed by powers of its own, but by powers which are continually and systematically from a given point operating to a preservation of health where it exists, and to a restoration of health where it has been lost or injured. Stahl, who was contemporary with Boerhaave, and in the university of Halle, in 1694, first started this loftier and more luminous idea—more luminous, though the light was still struggling with darkness—made the mind the controlling principle, and the *solidum vivum*, or nervous system, the means by which it acted. Fever, on his hypothesis, consisted in a constrictive or *tonic spasm*; in his own language, *spasmus tonicus*, produced by a torpor or inertness of the brain, at the extremity of the nerves, and counteracted by the remedial exertions of the mind, the *vires medicatrices* of his hypothesis, labouring to throw off the assailing power; whence the general struggle and commotion by which the febrile paroxysm is characterised. Hoffman, who was a colleague of Stahl, took advantage of this new view, followed up the crude and primary ideas of Stahl with much patient and laborious investigation, and soon presented to the world a more correct system, in a more attractive style; but, apparently, with a disengenuous concealment of the source from which he had borrowed his first hints. He omitted the metaphysical part of the Stahlian hypothesis, took from the mind the conservative and remedial power over the different organs, with which Stahl had so absurdly endowed it; seated this power as a law of life in the general organisation; separated the nervous from the muscular fibres, the latter of which were regarded as only the extremities of the former by Stahl; allowed a wider range and longer term to the constrictive spasm of fever, and changed its name from *spasmus tonicus* to *spasmus periphericus**: giving also to the moving power of the muscular or irritable fibres the name of *vis insita*, as that of the nervous fibre was called *vis nervæ*.

It is highly to the credit of Boerhaave that his mind, in the latter part of his life, was so fully open to the merits of this hypothesis, that he admitted the agency of the nervous power, though a doctrine that struck at the root of his own system, of which we have a clear proof in the change which occurs in the fourth edition of his Aphorisms, and particularly aphorism 755., where he lays down the proximate cause of intermitting fevers. Hitherto it had run thus: "Unde post accuratum examen totius historię intermittentium causa proxima constituitur viscositas liquidi arteriosi." But to this, in the edition before us, is added the following: "forte et nervosi (liquidi) tam cerebri, quam cerebelli cordi destinati, inertia."†

It is also equally creditable to the learned Gaubius, that, though strongly attached to the Boerhaavian school, in which he was educated, and a zealous contender for many of its doctrines, his understanding was alike open to the clearer and simpler views of the chemists of the day, upon various points not yet generally

* Med. Nat. Systémat., tom. iii. § 1. cap. 4. Boechmer, Diss. de Spasmi Peripherici signo in Febribus continentibus. Hal. 1765.

† De Motu Tonico. Theoria Medica vera. Halle, 1734.

adopted, and allowed him to become a more thorough convert to their philosophy. The reader may judge of this change in his mind by the following passage: "An et naturæ humanæ facultas inest, molerculas, acris detritas aut intropressas angulis, in sphæculas tornando, blanditium creandi? Non satis constat speciosam ideam æqualiter in fluidam solidamque acrimoniam quadrare. — Credibilis profectò mixtione chemica magis quam mechanica rotundatione, id opus perfici."* In effect, there not only was at this time, but had been for many years antecedently, a general feeling among the cultivators of medicine, that neither the laws of animal chemistry, nor of the living fibre, had been sufficiently studied for the purposes of a correct pathology: in proof of which it may be sufficient to refer to various articles on both subjects, inserted in the *Ephemerides Naturæ Curiosorum*, published at Frankfort, in 1684; and the writings of Baglivi†, and Dr. Willis‡; and still more particularly to Dr. Gilchrist's elaborate treatise on nervous fevers§; who, following up the hint thrown out by Boerhaave in the aphorism just quoted, endeavours to show how well the two ideas of lentor and spasm are disposed to amalgamate in forming the proximate cause of fever; the spasm consisting of an universal muscular tension, and the lentor being united, according to the nature of the case, with inflammation, acrimony, or both; and hence often producing what he denominates an alternate *NISUS* and *RENISUS*.

The materials, however, were now becoming too unwieldy; and the wheels of the machine were clogged by the very forces that were designed to increase its motion. Dr. Cullen was well aware of this, and boldly ventured upon a new attempt for the purpose of simplifying and facilitating its progress. For his basis he took the hypothesis of Stahl, as modified and improved by Hoffman: and on this basis erected his stately and elaborate structure, so well known to the medical world, full of ingenuity and daring genius, and which, if it be at this moment crumbling into decay, certainly is not falling prostrate before any fabric of more substantial materials, or more elegant architecture. Dr. Cullen has been accused of the same want of ingenuousness towards Hoffman, as Hoffman is chargeable with towards Stahl; and of having introduced his system to the public with little or no acknowledgment of the sources from which he has drawn. But, surely, no one can bring forward such an accusation, who has read with any degree of attention the preface to his *Practice of Physic*, in which he gives a full account of Dr. Hoffman's system in his own words, and pays complete homage to his merit.

According to the more elaborated principles of the Cullenian system, the human body is a congeries of organs, regulated by the laws not of inanimate matter, but of life, and superintended by a mobile and conservative power or energy, seated in the brain, but distinct from the mind or soul; acting *wisely* but *necessarily*, for the general health; correcting deviations and supplying defects, not from a knowledge and choice of the means, but by a pre-established relation between the changes produced and the motions

ORDER I.

Pyrectica.

Proximate cause.

III. Spasm of the extreme vessels.

General inclination to the same views long in previous existence.

Baglivi, Willis, Gilchrist.

Cullen's modification in the formation of a new system,

Its high merit.

System explained.

* *Pathol.*, § 298—300.† *Specimen de Fibrâ Motrici et Morboso*.‡ *Pathologia Cerebri et Nervorum*.§ *Edin. Med. Trans.*, vol. iv. art. xxiii. and vol. v. part ii. art. xlviii.

ORDER I.
Pyretica.
Proximate
cause.

III. Spasm of
the extreme
vessels.

Close associa-
tion of brain,
stomach, and
extreme ves-
sels.

Energy of the
brain, what.

Alternately
excited and
collapsed.

Nervous fluid
not a secretion.

Fever hence
accounted for.

Cullen's prox-
imate cause of
fever.

Energy of the
brain restored
by debility.

required for the restoration of health; and operating, therefore, through the medium of the moving fibres, upon whose healthy or unhealthy state depends the health or unhealthiness of the general frame: which fibres he regarded, with Stahl, as simple nerves, the muscular filaments being nothing more than their extremities, and by no means possessed of an independent vis insita.

The brain, therefore, upon this hypothesis, is the primum mobile, but it closely associates in its action with the heart, the stomach, and the extreme vessels. The force of the heart gives extension to the arteries, and the growth of the body depends upon such extension, in conjunction with the nutritious fluid furnished by the brain, and deposited by the nerves in the interstices of their own fibres; the matter of which fibres is a solid of a peculiar kind, whose parts are united by chemical attraction. All nervous power commences in the encephalon; it "consists in a motion beginning in the brain and propagated from thence into the moving fibres, in which a contraction is to be produced. The power by which this motion is propagated we name," says Dr. Cullen, "the ENERGY of the brain; and we therefore consider every modification of the motions produced, as modifications of that energy."* He further lays is down as a law of the economy, that the energy of the brain is alternately excited and collapsed, since every fibrous contraction is succeeded by a relaxation: whence spasms and convulsions are *motus abnormes*, and consist in an irregularity of such alternation. But we must distinguish in this system between the energy of the brain and the vital fluid it sends forth by the nerves; for, while the former rises and sinks alternately, the latter remains permanently the same. It is not a secretion, but an inherent principle, never exhausted, and that never needs renewal.†

This hypothesis, in its various ramifications, influenced every part of his theory of medicine, and consequently laid a foundation for his doctrine of fever. The proximate cause of fever was, in his opinion, a collapse or declination of the energy of the brain, produced by the application of certain sedative powers, as contagion, miasm, cold, and fear, which constitute the remote causes. This diminished energy extends its influence over the whole system, and occasions an universal debility; but chiefly over the extreme vessels, on which it induces a spasm; and in this spasm the cold fit is supposed to consist.

"Such, however," to adopt the words of Dr. Cullen himself, "is the nature of the animal economy, that this debility proves an indirect stimulus to the sanguiferous system; whence, by the intervention of the cold stage, and spasms connected with it, the action of the heart and larger arteries is increased, and continues so till it has had the effect of restoring the energy of the brain, of extending this energy to the extreme vessels, of restoring therefore their action, and thereby especially overcoming the spasm affecting them; upon the removing of which, the excretion of sweat, and other marks of the relaxation of the excretories take place."‡

This relaxed or perspiratory section of the paroxysm, however,

* Mat. Med., part ii. chap. viii. p. 349.

† Ibid., part ii. chap. vi. p. 223.

‡ Prac. of Phys., § xlvii.

is not regarded by Dr. Cullen as a part of the disease, but as the prelude to returning health. Yet the fit still consists of three stages: the first, of debility or diminished energy; the second, of spasm, and the third of heat. And though Dr. Cullen had some doubts whether the remote cause of fever might not produce the spasm, as well as the atony of the nervous system, yet he inclined to ascribe the second stage to the operation of the first, as he did most decidedly the third to that of the second: and thus to regard the whole as a regular series of actions, employed by the *vis medicatrix naturæ* for the recovery of health.

That fever, in its commencement, or earliest stage, is characterised by debility of the living fibre, or, more closely in the words of Dr. Cullen, by diminished energy of the brain, extending directly or indirectly to the voluntary muscles and capillaries, and producing the *signa prodroma* of Professor Frank*, cannot for a moment be doubted by any one who accurately watches its phenomena. And thus far the Cullenian hypothesis is unquestionably correct; as it appears to be also in supposing the cold stage to be the foundation of the hot, and of the excretion of sweat, by which the hot stage is succeeded; the entire series forming Frank's *signa constitutiva*. But it fails in the two following important points, without noticing a few others of smaller consequence. The spasm on the minute vessels, produced by debility, takes the lead in the general assault; and, though it forms only a link in the remedial process, is the most formidable enemy to be subdued; and hence, all that follows in the paroxysm is an effort in the system to overcome this spasm. The effort at length proves successful, the debility yields to returning strength, the spasm is conquered, and the war should seem to be over. But this is not the fact: the war continues notwithstanding; there is nothing more than a hollow truce; debility and spasm take the field again, and other battles remain to be fought. There is nothing in this hypothesis to account for a return of debility and spasm after they have been subdued; nor to show why spasm should ever in the first instance be a result of debility. "In this system," says Dr. Parr, "the production of spasm by debility is an isolated fact without a support; and the introduction of the *vires medicatrices naturæ* is the interposition of a divinity in an epic, when no probable resource is at hand."

The next striking defect is, that debility is here made a cause of strength; the weakened action of the first stage giving rise to the increased action and re-excited energy that restore the system to a balance of health: and here again we stand in need of the interposition of some present divinity, to accomplish such an effort by such means.

IV. It is not, therefore, to be wondered at, that this system, with all its ingenuity and masterly combination, should not have proved satisfactory to every one. In reality, it did not for many years prove satisfactory to every one in the celebrated school in which it was first propounded. And hence, under the plastic hands of Dr. Brown arose another hypothesis, of which I shall proceed to give a very brief outline, together with the modification it received under the finishing strokes of Dr. Darwin.

ORDER I.

Pyrectica.
Proximate
cause.

III. Spasm of
the extreme
vessels.

Division of the
paroxysm into
three stages,
not including
that of sweat.
System how
far correct.

In what respect
it fails.

Febrile paroxysms not accounted for after the first,

Error in
making debility
a cause of
strength.

IV. Accumulated or exhausted excitability.

Excitability, or doctrine of Brown.

* De Curand. Hom. Morb., tom. i. p. 3. 8vo. Mannh. 1792.

ORDER I.
Pyrectica.
Proximate
cause.

IV. Accumulated or exhausted excitability.

Rise of Dr. Brown and his hypothesis.

Its simplicity and plausibility.

Hypothesis explained.

Excitability alternately accumulated and exhausted.

Farther illustrated.

Doctrine of fevers, how divided and treated.

Dr. Brown, who was at first a teacher of the classics at Edinburgh, and a translator of inaugural theses into Latin, commenced the study of medicine about the middle of life, by a permission to attend the medical schools gratuitously. He was at first strongly attached to Dr. Cullen and Dr. Cullen's system; but an altercation ensued, and he felt an equal animosity towards both. A new and opposite system, if so it may be called, was in consequence manufactured and publicly propounded in a variety of ways. It had great simplicity of principle, and some plausibility of feature; it attracted the curious by its novelty, the indolent by its facility, and every one by the boldness of its speculations. It circulated widely, and soon acquired popularity abroad as well as at home.

Man, according to Dr. Brown, is an organised machine, endowed with a principle of excitability, or predisposition to excitement, by means of a great variety of stimuli, both external and internal, some of which are perpetually acting upon the machine; and hence the excitement, which constitutes the life of the machine, is maintained. Excitability, therefore, is the nervous energy of Dr. Cullen; and, like that, is constantly varying in its accumulation and exhaustion: yet not, like the nervous energy of Dr. Cullen, under the direction and guidance of a *vis conservatrix et medicatrix naturæ*, distinct from the matter of the organisation itself, but passively exposed to the effect of such stimuli as it may chance to meet with, and necessarily yielding to their influence.

Upon this hypothesis excitement is the vital flame, excitability the portion of fuel allotted to every man at his birth, and which, varying in every individual, is to serve him without any addition for the whole of his existence; while the stimuli, by which we are surrounded, are the different kinds of blasts by which the flame is kept up. If the fuel, or excitability, be made the most of, by a due temperature or mean rate of blasts or stimuli, the flame or excitement may be maintained for sixty or seventy years. But its power of supporting a protracted flame may be weakened by having the blast either too high or too low. If too high, the fuel or excitability will, from the violence of the flame, be destroyed rapidly, and its power of prolonging the flame be weakened directly; and, to this state of the machine Dr. Brown gave the name of indirect debility, or exhausted excitability. If the blasts or stimuli be below the mean rate, the fuel, indeed, will be but little expended, but it will become drier and more inflammable; and its power of prolonging the flame will be still more curtailed than in the former case; for half the blast that would be required to excite rapid destruction antecedently, will be sufficient to excite the same effect now. This state of the machine, therefore, the author of the hypothesis contra-distinguished by the name of direct debility, or accumulated excitability.

Upon these principles he founded the character and mode of treatment of all diseases. They consist but of two families, to which he gave the name of sthenic and asthenic; the former produced by accumulated excitability, and marked by direct debility; the latter occasioned by exhausted excitability, and marked by indirect debility. The remedial plan is as simple as the arrangement. Bleeding, low diet, and purging, cure the sthenic diseases; and stimulants of various kinds and degrees, the asthenic.

Fevers, therefore, under this hypothesis, like other diseases, are either sthenic or asthenic: they result from accumulated or exhausted excitability. Synocha, or inflammatory fever (causa under the present arrangement), belongs to the first division, and typhus to the second. Let us try the system by these examples.

The first symptoms of inflammatory fever, like those of all others, evince, as I have already observed, debility or languid action in every organ, let the debility be distinguished by whatever epithet it may. The vital flame is weak, and scarcely capable of being supported; and yet the fuel is more inflammable than in a state of health; the excitability is accumulated. This scheme, therefore, completely fails in accounting for the origin or first stage of inflammatory, or, in Dr. Brown's own language, sthenic fever.

Typhus pestilens, or jail-fever, is arranged by Dr. Brown as an asthenic disease; and, as such, we have reason to expect debility, as characteristic of its entire progress. Yet, what is it that produces this debility? The blast or stimulus is here contagion; and the excitability is exhausted by the violence of this blast or stimulus; but there is no means of its becoming exhausted without increasing the excitement: the fuel can only be lessened by augmenting the flame that consumes it. Yet in typhus, according to this hypothesis, the fuel is expended, not in proportion as the flame is active and violent, but in proportion as it is weak and inefficient. The excitability is exhausted, and the debility increases in proportion as the excitement forbears to draw upon it for a supply. The blast blows hard, but without raising the fire, and yet the fuel consumes rapidly. This scheme, therefore, completely fails in accounting for any stage of low or asthenic fevers of every description.

Dr. Brown, however, was not a man of much practice; his writings show that he was but little versed in the symptoms of diseases; his descriptions are meagre and confused: and hence, when he comes to assort diseases into the only two niches he allots for their reception, he makes sad work; and maladies of the most opposite characters, and demanding the most opposite mode of treatment, are huddled together to be treated in the same manner, in many cases with no small risk of the patient. Thus, among the sthenic diseases are associated rheumatism, erysipelas, scarlet and inflammatory fever; and, among the asthenic, gout, typhus, apoplexy, and dropsy.

The Brunonian hypothesis, nevertheless, offers one principle that is unquestionably founded on fact, and is peculiarly worthy of attention; I mean, that of accumulated excitability from an absence or defect of stimuli; in colloquial language, an increase of energy by rest. And it is this principle, which forms the hinge on which turns the more finished system of Dr. Darwin.

Sensible of the objection that weighs equally against that part of the system of Dr. Cullen and Dr. Brown, which represents the energy or excitability of the living frame as capable of recruiting itself after collapse or exhaustion, without a recruiting material to feed on, he directly allows the existence of such a material; regards it as a peculiar secretion, and the brain as the organ that elaborates and pours it forth. The brain, therefore, in the system

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Wherein the hypothesis fails.

In respect to inflammatory fever.

In respect to typhus.

Inadequacy of Brown's descriptions and arrangement.

Opposite diseases united.

One principle worthy of notice.

Hypothesis of Dr. Darwin.

Spirit of animation modified, doctrine of Cullen.

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cause.

IV. Accumulated or exhausted excitability.

Improvement upon Brown; but chargeable with materialism.

Doctrine explained.

How applied to fever.

Fails in accounting for the entire paroxysm.

of Dr. Darwin, is the common fountain from which every other organ is supplied with sensorial fluid, and is itself supplied from the blood, as the blood is from the food of the stomach.

All this is intelligible; but when, beyond this, he endows his sensorial fluid with a mental as well as a corporeal faculty, makes it the vehicle of ideas as well as of sensation, and tells us, that ideas are the actual "contractions, or motions, or configurations, of the fibres which constitute the immediate organ of sense*," he wanders very unnecessarily from his subject, and clogs it with all the errors of materialism.

He supposes the sensorial power, thus secreted, to be capable of exhaustion in four different ways, or through four different faculties of which it is possessed: the faculty of IRRITABILITY, exhausted by external stimuli affecting simple irritable fibres: that of SENSIBILITY, exhausted by stimuli affecting the fibres of the organs of sense: that of VOLUNTARITY, exhausted by stimuli affecting the fibres of the voluntary organs, acting in obedience to the command of the will; and that of ASSOCIABILITY, exhausted by stimuli affecting organs associated in their actions by sympathy or long habit. By all, or any of these means, the sensorial power becomes evacuated, as by food and rest it becomes replenished, often, indeed, with an accumulation or surplus stock of power.

In applying this doctrine to fever, he considers its occasional causes, whatever they may be, as inducing a quiescence or torpor of the extreme arteries, and the subsequent heat as an inordinate exertion of the sensorial power hereby accumulated to excess; and, consequently, the fever of Dr. Darwin commences a stage lower than that of Dr. Cullen, or in the cold fit, instead of in a collapse of the nervous energy lodged in the brain.

Now, allowing this explanation to account for the cold and hot stages of a single paroxysm of fever, like the spasm of Dr. Cullen, it will apply no farther. For, when the sensorium has exhausted itself of its accumulated irritability, the disease should cease. It may, perhaps, be said, that a second torpor will be produced by this very exhaustion, and a second paroxysm must necessarily ensue. Admitting this, however, for a moment, it must be obvious that the first or torpid stage only can ensue; for the system being now quite exhausted, the quiescence that takes place during the torpor can only be supposed to recruit the common supply necessary for health; we have no reason to conceive, nor is any held out to us, that this quantity can again rise to a surplus. Yet it must be farther remarked, that, in continued fevers, we have often no return of torpor or quietude whatever, and, consequently, no means of reaccumulating irritability; but one continued train of preternatural action and exhaustion, till the system is completely worn out. And to this objection, the Darwinian hypothesis seems to be altogether without a reply.

A still later modification of the Brunonian system (for after all it is such, though the name of Brown is hereby openly despised), has been attempted in France by M. Broussais, and has acquired a very considerable degree of popularity, though a popularity that seems to have little chance of a longer duration than the two

* Zoonom., vol. i. sect. II. ii. 7.

forms by which it has been preceded. Throwing out of the catalogue of vital properties the sensibility of Bichat, and indeed all other vital properties whatever but organic contractility, he maintains that this alone is the real source of all diseases whatever, and that no other exists or is wanted. This contractility is the excitability of Brown, and to the excitement that flows from it M. Broussais has given the name of irritation or excitation, upon a plus or minus degree of which all diseases, as in the hypothesis of Brown, are dependent. But he has this great advantage over Brown, that instead of making the state of excitement or depression common to the entire system, M. Broussais limits both to particular organs, and contends, that when an organ is in a state of irritation, or *vital erection*, to adopt another quaint term from the technology he employs, such effect can only take place at the expense of some other part of the system, the contractility of which is proportionably diminished.* Diseases with him, therefore proceed, for the most part, from an unequal distribution of excitation or irritation; and as the doctrine of sympathy is carried to a considerable extent, and plays a very important part in the pathological drama, often indeed a very ingenious part, the author of the hypothesis obtains an easy and occasionally a correct mode of accounting for local diseases that originate in remote quarters; as, for example, when his favourite gastro-enteritis is the result [of a cold, damp atmosphere applied to the skin, or a morbid condition of the lungs or of the head. So that gastritis or gastro-enteritis, primary or induced, is almost every thing with him: all fevers are local affections, and, under whatever shape they may appear, their real seat is the stomach, or alvine canal. Among many weak parts of the hypothesis, one of the weakest is its inability of accounting for the chemical changes that are so perpetually taking place in the system during the influence of disease. For as the only source of disease is in the *quantity* of the efflux of the vital fluids, without any change whatever in their *quality*, it leaves us entirely in the dark as to the origin of scrofula, cancer, all the exanthems, and, in few words, every other specific poison or morbid secretion whatever; the greater part of which, if not the whole, are still referred to a gastric origin, where we are expressly commanded to look as definitely for the real seat of plague, as for bilious fever, yellow fever, Indian cholera, or dysentery.†

It is not necessary to pursue this subject farther. Other conjectures, more or less discrepant from those now examined, have been offered: but they have not acquired sufficient notice, nor evinced sufficient ingenuity, to be worthy of examination.

V. Other pathologists have referred the proximate cause of fever to a morbid affection of some particular organ, or set of organs, associated in a common function. Thus, Baron Haller alludes to several in his day, who ascribed it to a diseased state

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Doctrines of
Broussais.

V. Proximate
cause placed
in some local
disease.

* Exposition des Principes de la Nouvelle Doctrine Médicale, &c. Par J. R. A. Goupel. Paris, 1824.

† See M. Broussais' Examen de la Doctrine Médicale généralement adoptée, et des Systèmes Modernes de Nosologie. Paris, 1816. All the above observations by Dr. Good on the theory of Broussais, are new matter in the present edition, lately found amongst the author's MSS., and marked for insertion in this work. — ED.

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Pyrectica.
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cause.
V. Organic
disease.
Vena cava.
Liver.
Pancreas.
Doctrine of
Frank ;
of Broussais.

Inflamed brain,
doctrine of
Clutterbuck.

Fevers hereby
confounded
with inflamma-
tion.

Fevers identi-
fied with in-
flamations by
Marcus.

of the vena cava * ; Bianchi pitched upon the liver †, Swalve on the pancreas ‡, Rahn on the digestive organisation generally.§ Professor Frank has divided the different kinds of fever between the digestive organs, the arteries, and the nerves, each in a particular state of diseased action ; so that with him all fevers are nervous, inflammatory, or gastric.|| The Italian pathologists eagerly caught up this view, and modified it in various ways ; and Broussais has of late given it another modification, by placing fever in the mucous membrane of any of the viscera, but chiefly in the mucous membrane of the digestive canal ; and consequently gastric fever, with Broussais, takes the lead of all the rest, both in variety and vehemence of action : the particular character or intensity of the fever being resolvable into the temperament, idiosyncrasy, or other circumstances of the individual.¶ Dr. Clutterbuck has still more lately, in our own country, and with far more reason and learning, brought forward the brain instead of the stomach ; to an inflammation of which organ he ascribes fevers of every kind, regarding them merely as so many varieties of one specific disease, originating from this one common cause.** But this is to confound fever with local inflammation, the idiopathic with the symptomatic affection. In treating of inflammation under the ensuing Order, we shall have sufficient opportunities of seeing, that an inflamed state of almost any organ, and especially of membranous organs, or the membranous parts of organs, is sufficient to excite some degree of fever or other, and not unfrequently fever of the highest degree of danger from its duration or violence. And hence, the liver, the lungs, the stomach, the intestines, the peritonæum, and the brain have an equal claim to be regarded as furnishing a proximate cause of fever when in a state of inflammation.

A very striking objection to Dr. Clutterbuck's hypothesis, is, his limiting himself to a single organ as the cause of an effect, which is equally common to all of them. And on this ground it is, that Professor Marcus of Bavaria, who has contended with similar strenuousness for the identity of fever and inflammation, has regarded all inflamed organs as equal causes ; and is hereby enabled to account, which Dr. Clutterbuck's more restricted view does not so well allow of, for the different kinds of fever that are perpetually springing before us, one organ giving rise to one, and another to another. Thus, inflammation of the brain, according to Dr. Marcus, is the proximate cause of typhus ; inflammation of the lungs, of hectic fever ; that of the peritonæum, of puerperal fever ; and that of the mucous membrane of the trachea, of catarrhal fever : a view which has lately been adopted by several French writers of considerable intelligence, as an improvement upon the hypothesis of Broussais.††

* Bibl. Med., Pr. i. p. 112.

† Hist. Hepat., p. 112.

‡ Pancreas, &c. p. 141.

§ Briefwechsel, Band. i. p. 150.

|| De Cur. Morb. Hom. Epitome, tom. v. 8vo. Mannh. 1792-4.

¶ Examen des Doctrines Médicales, et des Systèmes de Nosologie, &c. Par F. J. V. Broussais, D.M. 8vo. 1821.

** Treatise on Fever, 8vo.

†† M. Gaultier de Claubry, vide Journ. Gén. de Médecine, Avr. 1823, and M. Tacheron, Recherches Anatomico-Pathologiques sur la Médecine Pratique, &c. 8vo. 3 tomes, Paris, 1823.

The general answer, however, to pathologists of every description who thus confound or identify fever with inflammation, whether of a single organ or of all organs equally, is, that, though fever is commonly a symptom or sequel of inflammation, inflammation is not uncommonly a symptom or sequel of fevers. And hence, though post-obit examinations, in the case of those who have died of fever, should show inflammation in the brain, the liver, or any other organ, it is by no means a proof that the disease originated there, since the same appearance may take place equally as an effect, [and as a cause: whilst a single example of fever terminating fatally, without a trace of inflammation in any organ whatever, and such examples are perpetually occurring, is sufficient to establish the existence of fever as an idiopathic malady, and to separate the febrile from the phlogotic divisions of diseases.*

“A fever, therefore,” to adopt the language of Dr. Fordyce, “is a disease that affects the whole system; it affects the head, the trunk of the body, and the extremities; it affects the circulation, the absorption, and the nervous system; it affects the skin, the muscular fibres, and the membranes; it affects the body, and affects likewise the mind. It is, therefore, a disease of the whole system, in every kind of sense. It does not, however, affect the various parts of the system uniformly and equally; but, on the contrary, sometimes one part is much affected in proportion to the affection of another part.”†

The result of the whole, as observed at the outset of this introduction, is, that we know little or nothing of the proximate cause of fever, or the means by which its phenomena are immediately produced. In the language of Lieutaud, applied to the subject before us, they are too often *atrâ caligine mersæ*; nor have any of the systems hitherto invented to explain this recondite inquiry, however ingenious or elaborate, answered the purpose for which they were contrived.‡

* “It is too generally imagined, that the primary disease which induces fever is essentially local inflammation. The application of this doctrine to the early stage of fever, we hold to be not only at variance with facts, but dangerous as to the practical deductions to which it leads. We know that irritation, far short of inflammation, is sufficient to excite feverish indisposition, more particularly at those periods of life, at which the vascular system is easily excited by apparently trivial, local, or sympathetic disturbance (for example, in infancy or childhood, by dentition, or intestinal irritation), and that this feverishness disappears when the cause is removed. The paroxysm of an intermittent is induced by the peculiar effect of a malarian poison; in this disease, the whole phenomena of fever are well marked, but certainly few will maintain, that the febrile disturbance is the consequence of local inflammation. There can be little doubt that the error alluded to may, in a great measure, be imputed to the attempts to discover the cause or nature of fever in the various local lesions which are observed in fatal cases. On the other hand, the important fact should ever be kept in view, that the primary disorder, whatever it may be, passes readily into inflammation, and that the lesions which arise in the progress of fever constitute the principal source of danger, and are in many instances the immediate cause of death.” Dr. Tweedie in *Cyclop. of Pract. Med.*, art. FEVER.

† On Fever, *Dissert.* i. p. 28.

‡ The following observations by Dr. Tweedie agree with those of Andral (*Anat. Pathol.* tom. ii. p. 211, &c. and *Clinique Méd.*). “In most cases of fever we can discover the existence of certain lesions, but these are too vague or indefinite to enable us uniformly to decide on the primary seat of the malady. It is

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Objections to
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tion of inflam-
mation and
fever.

Fever, as de-
scribed by
Fordyce.

General result.

Proximate
cause little
known.

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Remote causes.

Regarded by
Cullen as seda-
tive powers.

Marsh and
human effluvia
remote causes.

Auxiliary
remote causes
of Cullen.

Sufficient
weight not
allowed to
them.

Distinction
between marsh
and human
effluvia of no
great benefit.
Miasm and
contagion,
what.

From the proximate cause of fever, let us next proceed to a few remarks upon its REMOTE causes.

Dr. Cullen, who has striven so strongly and so ingeniously to simplify the former, has made a similar attempt in respect to the latter. He first resolves all remote causes into debilitating or sedative powers, instead of being stimulant, as they were formerly very generally considered, and as they are still regarded by many pathologists, and especially by those, who contemplate fever and inflammation as identical. Whether this position of Dr. Cullen be correct or not, it was necessary for him to lay it down and to maintain it, or he must have abandoned his system of fever altogether, which supposes it to commence in, and be primarily dependent upon debility.

These sedative or debilitating causes he reduces to two, — MARSH and HUMAN EFFLUVIA; to the former of which he limits the term miasmata, and the power of producing intermittent fevers, which, with him, include remittent; while, to the latter, he confines the term contagions, and the power of producing continued fevers. It is true, he has found himself compelled to take notice of a few other powers, as cold, fear, intemperance in venery or drinking; but these he is disposed to regard as little or nothing more than sub-agents, or co-agents, scarcely capable of producing fever by themselves.

“Whether fear or excess be alone,” says he, “the remote cause of fever, or if they only operate either as concurring with the operation of marsh or human effluvia, or on giving an opportunity to the operation of cold, are questions not to be positively answered; they may possibly of themselves produce fever; but, most frequently, they operate as concurring in one or other of the ways above mentioned.”* To cold, however, he attributes a power of engendering fever more freely than to the rest; “yet even this,” says he, “is commonly only an exciting cause, concurring with the operation of human or marsh effluvia.”†

We shall find, as we proceed, that these complementary causes may admit of addition; as we shall also, that they more frequently exist as independent agents, than Dr. Cullen is disposed to allow. Yet, there can be little doubt, that the chief and most extensive causes of fever are human and marsh effluvia.

No great benefit, however, has resulted from endeavouring to draw a line of distinction between these two terms, and hence it is a distinction which has been very little attended to of late years. *Miasm* is a Greek word, importing pollution, corruption, or defilement generally; and *contagion*, a Latin word, importing the application of such miasm or corruption to the body by the medium of touch.‡ Hence, there is neither parallelism, nor an-

more than probable, that, in what is usually called *idiopathic fever*, there is alteration either of the solids or fluids, although its precise locality cannot, in every case, be detected; but, without disease in either the one system or the other, we maintain that fever cannot exist.” Cyclop. of Pract. Med., art. FEVER.

* Pract. of Phys., book i. chap. iv. sect. xcvi.

† Ibid., book i. chap. iv. sect. xcii.

‡ A distinction is sometimes made between a *contagious* and an *infectious disease*; the former being communicable only by contact with the patient, or with something that he has touched, or some palpable matter that has proceeded from

tagonism, in their respective significations: there is nothing that necessarily connects them, either disjunctively or conjunctively. Both equally apply to the animal and the vegetable worlds — or to any source whatever of defilement and touch; and either may be predicated of the other; for, we may speak correctly of the miasm of contagion, or of contagion produced by miasm. Hence, the latter term is equally applied by Sauvages to both kinds of effluvia: “*Miasmata, tùm sponte in sanguine enata, tùm extus ex aëre, in massam sanguineam delata.**” And it is not a little singular, and confirms the force of this remark, that, since the publication of the first edition, in which the remark may be found as at present, M. Monfalcon, an ingenious and learned advocate of the Broussais hypothesis, has specifically applied, in direct contravention of Dr. Cullen’s explanation, the terms miasm and miasmata to those morbid effluvia alone which are thrown off from the *living bodies* of men and animals in a state of disease, the influence or pathological action of which on the human frame he denominates *contagion*: while the effluvia from marshes, swamps, privies, cemeteries, and other sources of decomposing animal and vegetable materials, he simply but specifically distinguishes by the name of *marsh effluvia*, and their pathological action by that of *infection*.†

In a work of practical information, it is hardly worth while to follow up the refinements of those writers, who deny, and endeavour to disprove, the existence of contagion under any form or mode of

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Miasm, how
applied by
Sauvages.

The denial of
contagion
hardly worth
attending to.

him. Of this kind are itch, syphilis, cow-pox, hydrophobia, elephantiasis, yaws, sibbens, the glanders, and, as is sometimes suspected, porrigo, and plague. *Infectious* diseases are those, which a person may contract by merely being exposed to the patient’s atmosphere. Some diseases are both *contagious* and *infectious*, being capable of propagation in both manners, as the small-pox, the chicken-pox, scarlatina, and the measles. The earliest suggestion of the different modes in which contagious and infectious disorders are propagated, was made by M. Quesnay, in his *Mém. sur les Vices des Humeurs* (*Mém. de l’Acad. Royale de Chir.*). This author admits two species of contagion: — “The first consists in the communication of diseases, which extend from one body to another by their property of multiplying the cause that has excited them, and of multiplying themselves in other subjects by this augmentation of cause: small-pox is a manifest instance of this species of contagion.” Quesnay’s second form of contagion is characterised by “the communication of a spontaneous movement, that extends from one body to another susceptible of this movement.” This he compares to the fermenting of dough, or the extension of putrefaction through flesh. As Baron Dupuytren has explained, in a valuable document on contagious diseases, it appears that some of them are transmitted through the medium of the air: such are measles and scarlatina, after attaining a certain stage. Others are communicated by contact, as, for instance, the itch; some usually require contact and friction: such is the venereal disease. Others, like the cow-pox and hydrophobia, need inoculation, or insertion. Some can be propagated only in one manner: such are measles, scarlatina, the itch, the cow-pox, and hydrophobia. Others may be communicated in several ways, as syphilis and small-pox, the first of which may be transmitted with and without friction, and by inoculation; and the second by inoculation, contact, or the medium of the atmosphere. Dupuytren errs, however, in stating that measles cannot be communicated by inoculation. See *Rapport fait à l’Institut en 1825, sur un Mém. de M. Costa relatif à l’Epidémie qui ravagea Barcelonne en 1821.* — Ed.

* *Nosol. Method.*, Cl. II. Febr. Theor., sect. 79.

† *Histoire des Marais et des Maladies causées par les Emissions des Eaux Stagnantes, &c.* 8vo. Paris, 1824.

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Remote causes.

All miasmata
morbid fer-
ments,

of various kinds
and from vari-
ous sources.

Those of exan-
thems distinct
and specific.

Those of marsh
and human
effluvia not
equally so ;

but supposed
so in Cullen's
system.

The supposi-
tion contra-
dicted by daily
facts.

Febrile miasm
in intermit-
tents ;

origin.* Such speculations may be ingenious and very learned, and find amusement for a leisure hour in the closet ; but they will rarely travel beyond its limits, and should they ever be acted upon, would instantly destroy themselves.

It is a question of more importance, whether we have yet the means of realising the distinction between human and marsh miasmata†, which Dr. Cullen has here laid down, and which has been generally adopted, from the weight of his authority. All specific miasmata may be regarded as morbid ferments, capable of suspension in the atmosphere, but varying very considerably in their degree of volatility, from that of the plague, which rarely quits the person except by immediate contact, to that of the spasmodic cholera of India, which works its way, if it be really from a specific poison, in the teeth of the most powerful monsoons, despising equally all temperatures of the atmosphere and all salubrities of district, and travelling with the rapidity of the fleetest epidemic. They are of various kinds, and appear to issue from various sources, but we can only discriminate them by their specific effects. These are most clearly exemplified in the order of exanthems ; in which, for some thousands of years, they have proved themselves to be of a determinate character in all parts of the world where they have been the subject of observation, differing only in circumstances that may be imputed to season, climate, and other external causes, or to the peculiar constitutions of the individuals affected. Thus, the miasm of small-pox has uniformly continued true to small-pox, and that of measles, to measles ; and neither of them has, in a single instance, run into the other disease, or produced any other malady than its own.

But, can we say the same of the supposed two distinct miasms of marsh and human effluvia ? Is it equally true, that the former has never produced any other than intermittent fever, or the latter any other than continued ? And is it also equally true, that each of these maladies adheres as strictly to its own character in every age, and every part of the world, as small-pox and measles ; and that they have uniformly shown as strong an indisposition to run into each other ? Dr. Cullen's system is built upon an affirmative to these questions. For it, in fact, allows but two kinds of fever, each as distinctly proceeding from its own specific miasm as any of the exanthems.

But this is to suppose what is contradicted by the occurrences of every day : which compel us to confess, that, while we cannot draw a line of distinction between marsh and human effluvia from their specific effects, we have no other mode of distinguishing them.

Some writers, indeed, have denied that intermittents, or rather

* Lassis, *Recherches sur les véritables Causes des Maladies Epidemiques appelées Typhus, ou de la Non-contagion des Maladies Typhoides, &c.* 8vo. Paris, 1813. Maclean's *Results of an Investigation respecting Epidemic and Pestilential Diseases, &c.* 2 vols. 8vo. 1817-18.

† Johnson, *Influence of Tropical Climates, &c.* pp. 20, 21. 3d edit. 1822. Miasm still denotes, in the common language of the profession, only the exhalations of decaying vegetable matter, which are the exciting causes of intermittent and remittent fevers. As Dr. Elliotson has very justly observed, however, *marsh-miasm* is an improper expression : it generally comes from a marsh, but it may arise without the presence of any marsh at all. Hence the term *malaria* is frequently preferred. — Ed.

the intermittents of marsh-lands, are produced by a miasm of any kind; for they deny that any kind of miasm is generated there; and contend, that the only cause of intermittents, in such situations, is air vitiated by being deprived of its proper proportion of oxygen in consequence of vegetable and animal putrefaction, combined with the debilitating heat of the autumnal day, and the sedative cold and damp of the autumnal night.* But this opinion is too loosely supported to be worthy of much attention. It is sufficiently disproved by the intermittent described by Sir George Baker, as existing in the more elevated situations of Lincolnshire, while the adjoining fens were quite free from it.† And, in like manner, the severe and intractable intermittents, of whatever form or modification, that exercise their fearful sway from Cape Comorin to the banks of the Cavery, from the Ghauts to the coast of Coromandel, not unfrequently pass into a contagious type, and propagate themselves by contagion.‡ We have as much reason to suppose a febrile miasm in intermittents as in typhus; and, in some instances, they have been found as decidedly contagious. "That intermittent fevers," says Dr. Fordyce, "produce this matter, or, in other words, are infectious, the author (meaning himself) knows from his own observation, as well as from that of others."§

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sometimes contagious.

Febrile miasm probably the same produced from both effluvia.

And, notwithstanding that it becomes us to speak with diffidence upon a subject, respecting which we are so much in want of information, I may venture to anticipate, that the evidence to be advanced in the ensuing pages upon the general nature and diversities of fever, will show, that there is more reason for believing, that the febrile principle, produced by marsh and human effluvia, is a common miasm, only varying in its effects by accidental modifications, and equally productive of contagion, than that it consists of two distinct poisons, giving rise to two distinct fevers, the one essentially contagious, as contended for by Dr. Cullen.||

In effect, we shall perceive, that this mysterious subject is capable of being, in some degree, more clearly elucidated and still farther simplified, than it has been by preceding pathologists.

In the decomposition of all organised matter, whether vegetable or animal, when suddenly effected by the aid of heat and moisture, an effluvia is thrown forth that is at all times highly injurious to

Proposed elucidation of the subject.

Insalubrious effluvia from the decomposition of all dead organised matter.

* Currie, Trans. Amer. Phil. Soc.

† Medic. Trans., vol. iii. art. xiii.

‡ Report on the Epidemic Fever of Coimbatore; by Drs. Ainsly, Smith, and Christie.

§ On Fever, Diss. i. p. 117. Notwithstanding Dr. Good's arguments, the Cullenian doctrine still prevails. "It appears quite certain," says Dr. Elliotson, "that intermittent and remittent fevers are not contagious." If a person catch a disease by going to see a patient who is labouring under it, this is no proof that the disorder is contagious; for the patient may be in the very spot where he contracted it from local circumstances; and the visiter goes to the spot, and exposes himself to the same causes. In order to prove that a disease is contagious, there should be a sufficient number of instances of persons going from the place where they contracted the disease, to a healthy part, and there giving it to others. On this point the reader will find valuable rules of evidence laid down by Dr. Alison, (On Epidemic Fever, in Edinb. Med. and Surg. Journ., vol. xxviii.), and various judicious reflections by Professor Elliotson, in his Lectures delivered at the Lond. Univ., as published in Med. Gaz. 1831-2, p. 921. — Ed.

|| Certain difficulties, in the adoption of this view of the subject, will be noticed when intermittent fever comes under consideration. — Ed.

ORDER I.
Pyrethica.
Remote causes.
Burial grounds
in France.

Malaria on the
Guinea coast.

In these in-
stances accom-
panied with a
stench which
itself may be
injurious to the
health.

the health, and, in a closely concentrated state, fatal to life itself. Thus, we are told by Fourcroy, that, in some of the burial grounds in France, whose graves are dug up sooner than they ought to be, the effluvium from an abdomen, suddenly opened by a stroke of the mattock, strikes so forcibly upon the grave-digger as to throw him into a state of asphyxy, if close at hand; and, if at a little distance, to oppress him with vertigo, fainting, nausea, loss of appetite, and tremors for many hours: whilst numbers of those, who live in the neighbourhood of such cemeteries, labour under dejected spirits, sallow countenances, and febrile emaciation.* This effluvium is from the decomposition of animal matter alone; but, the foul and noisome vapour, that is perpetually blown off the coast of Batavia, and the stinking malaria that rushes from the south-east upon the Guinea coast, though loaded with vegetable exhalations alone, triumph in a still more rapid and wasteful destruction. The last peculiarly so, as being thoroughly impregnated with destructive miasm, while sweeping over the immense uninhabitable swamps and oozy mangrove thickets of the sultry regions of Benin, inso-much that Dr. Lind informs us, that the mortality produced by this pestilential vapour in the year 1754 or 1755 was so general, that, in several negro towns, the living were not sufficient to bury the dead; and that the gates of Cape Coast Castle were shut up for want of sentinels to perform duty; blacks and whites falling promiscuously before this fatal scourge.

In this case, as in the preceding, the vapour is always accompanied with an intolerable stench from the play of affinities between the different gases that are let loose by the putrefactive decomposition; and hence it is impossible to affirm, that the mortality, thus produced, is the result of any single or specific miasm operating to this effect. But it shows us, that the general effluvium from the decomposition of all dead organised matter, whether animal or vegetable, is equally deleterious to health and life. "Its presence," says the judicious Dr. Jackson, "is often connected with something offensive to the senses,—to the smell, and, perhaps, even to the

* *Elém. de Chimie, Art. Putréfaction de Subst. Animal., tom. iv.* These facts prove nothing more than either the asphyxiating nature, or the general unfavourable influence of such effluvia on the human constitution, and not the existence of any specific miasm or contagion, capable of bringing on either intermittent or continued fever. On this subject the following observations are curious and instructive:—"That it is vegetable and not animal matter which produces ague, is proved by this circumstance, that no person has that affection from being exposed to the most intense animal exhalations. Thousands of carcasses are annually employed in many manufactories, and yet no person is known to contract an ague from them; indeed, so far from it, that the most crowded places generally escape intermittent fevers. That part of Rome inhabited by the Jews, and called the *Judaicum*, is full of animal filth, but it escapes ague, while the elegant streets in the neighbourhood suffer from it very severely. Malaria not being the produce of dead animal matter, or effluvia arising from living bodies, the more men and animals are crowded together, the less access is there for the malaria; and, indeed, it is generally supposed, that the addition of smoke of every description has a great tendency to prevent it." (Professor Elliotson's *Lect. at Lond. Univ. as published in Med. Gaz. for 1831-2, p. 895.*) Further remarks on this point will be introduced when we come to intermittent fever, and here the editor will merely refer to the observations of M. Andouard, *Recherches sur la Fièvre Jaune*, and to various facts adduced by M. Brachet, of Lyons, in confirmation of the truth of the above view. *Archives Gén. de Méd., tom. ix. pp. 380, 381. — Ed.*

taste. A certain degree of salivation, nausea, sickness, and headache, are often occasioned by the exhalations of a *swamp*, or the air of an *infected apartment*, but febrile action is not ordinarily the immediate consequence. To produce fever a space of time is required, different according to circumstances.* How far the decomposition of dead vegetable matter, though its effluvium prove thus injurious to the health of man, may *alone* be capable of exciting fever of any kind, may, perhaps, admit of a doubt; for, in the bogs or peat-mosses of Scotland, and, still more, those of Ireland, the inhabitants are exempt from agues, though the ooze extends in immense tracts.†

The decomposition, however, to which, on the present occasion, we are chiefly to direct our attention, is of a mixed kind; for the marsh and oozy soil of countries, that are closely or have been long inhabited, is necessarily a combination of animal and vegetable matter.

If this decomposition take place slowly, as in cold or dry weather, and more particularly in a breezy atmosphere, not the slightest evil is sustained during its entire process. And hence, in order to render it mischievous, and particularly in order to render it capable of producing fever of any kind, it is necessary that it should be assisted by the co-operation of certain agents, many of which we do not seem to be acquainted with, but which, so far as we are capable of tracing them, appear to be auxiliary to the general process of putrefaction, as warmth, moisture, air, and rest or stagnation.

The simplest and slightest fever, that is produced under the joint influence of these powers, is the intermittent: and we find these produced where their joint influence is but feeble, and where it exists, perhaps, in its lowest stage, as in the favourable climate of our own country; where we are not frequently overloaded with equinoctial rains, and have not often to complain of a sultry sky, or a stagnant atmosphere. Even here, however, we perceive a change in the character of the intermittent at different seasons: for, while in the spring it usually exhibits a tertian type, in the autumn we find it assume a quartan. And as these can only be contemplated as varying branches of the same disease, we have thus far, at least, reason to regard it as produced by a common febrile miasm, modified in its operation by a variation in the relative proportion which its auxiliaries, known and unknown, bear to each other during the vernal and autumnal seasons; coupled, perhaps, with some degree of change, produced by the same seasons in the state of the human body.

If from our own country we throw our eyes over the globe, we

ORDER I.
Pyrectica.
Remote causes.

Soil of marshes a compound of animal and vegetable principles.

The decomposition not injurious when slow.

What agents quicken and render it capable of generating a febrile miasm.

Where their influence is feeble the result is intermittents.

Fevers varied in their type, and power by the varying influence of the febrile auxiliaries on the febrile miasm; and the varying state of the human body.

* Outline of the History and Cure of Fever, part i. ch. iii. p. 104.

† The following is the explanation of this circumstance, given by Professor Elliotson:—"There is one description of bog which does not produce malaria; but then there is no putrefaction; decomposition has taken place in a peculiar manner. The vegetable matter becomes carbonised, and there is not sufficient heat for putrefaction to occur; but, it is said, that when peat-moss is in a certain latitude, and on a certain level, it can putrefy, and then, I believe, ague does prevail. That peat-bog does not putrefy is shown by a fact stated on good authority, viz. that animal matter thrown into it will not putrefy; but, it is said, that where peat-moss is placed in other situations, where it is warmer, and upon a proper level for moisture, it will putrefy and produce ague, just as other kinds of vegetable matter do." Lect. at Lond. Univ., Med. Gaz. 1831-2, p. 895.—Ed.

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Pyrectica.
Remote causes.

The more
vigorous or
abundant the
auxiliaries, the
severer the
fever.

Influenced
also by the
constitution of
the patient.

Hence remit-
tent and con-
tinued, as well
as intermittent
fevers.

Exemplified
by Devèze and
Berthé.

Illustrated by
the yellow fever
at Antigua in
1816.

Debilitated,
subjects suffer
sooner and
more severely
when newly
exposed to
miasm.

Explanation of
this fact.

shall find in every part of it, where the same causes exist, that, in proportion as they rise in potency, they produce a fever of a severer kind, more violent in its symptoms, and more curtailed in its intervals, till we gradually meet, first with no distinct intervals, and at length with no intervals whatever; and hence perceive the remittent progressively converted into intermittent and continued fevers. And that here we have still the same miasm, merely modified in its operation by the varied action of its auxiliary powers on the constitution of the individuals it attacks, is as clear as in the former case; because, in many attacks, we see different individuals, touched by the very same influence, exhibit all the varieties now alluded to, and intermittent, remittent, and continued fevers co-existing in every diversity of violence; commencing with either of these forms; keeping true to the form with which they commenced; or changing one form for another.* Such, as remarked by M. Devèze, was the course of the fever at Philadelphia in 1793†; and such, according to M. Berthé, that of the southern provinces in Spain, in 1800‡: and such was peculiarly the fact in the highly malignant yellow fever of Antigua in 1816, as admirably described by Dr. Musgrave.§

This last disease first showed itself during sultry weather and a quiet atmosphere, in a swampy part of the island, among a ship's crew lately arrived, but from a healthy vessel, and themselves in good health on first landing. It soon spread widely, and at length indiscriminately in town and country, among all ranks and conditions and situations, blacks as well as whites, the oldest settlers as well as the newest comers. In some cases, the head was chiefly affected; in others, the stomach, the liver, or a still different organ. Hiccough and black vomit were common towards the close of the disease, though many died without it; and recovery was *no exemption* from a second attack.

Dr. Musgrave asserts, further, that, during the whole of this fatal epidemic, there was no instance of its being received by contagion. The argument, however, which he offers upon this subject, is not quite convincing. Yet, admitting the fact to be as he states it, we have an additional proof, if proof were wanting, firstly, that, when the animal frame has been previously debilitated or relaxed, as in the case of a ship's crew that has been long voyaging in high latitudes, and living on salted provisions, it suffers sooner and more severely than where no such relaxation has taken place: and, secondly, that, by a long and gradual exposure to the influence of febrile miasm, however produced, whether from the living human body or from dead organised matter, the animal frame becomes torpid to its action, as it does to the action of other irritants. Whence

* See Sir Gilbert Blane's valuable article on Yellow Fever, in his *Select Dissertations*, &c. p. 284. 8vo. Lond. 1829. All these facts may be true, without proving that malaria alone will give rise to continued fever, except in a secondary, indirect manner, when the change of the intermittent fever to this type may be explained by reference to morbid visceral alterations, sometimes brought on by intermittent fever, and possibly, also, in hospitals, by taking into the account the influence of the effluvia from patients congregated in such buildings. A similar mode of reasoning would account for the variation of continued fever to the intermittent or remittent type, when the patient is exposed to malaria. — Ed.

† *Traité de la Fièvre Jaune*, &c. 8vo. Paris, 1820.

‡ *Précis Historique de la Maladie, qui a régné dans l'Andalousie en 1800*.

§ *Medico-Chirurg. Trans.*, vol. ix. p. 92.

prisoners confined in jails with typhous miasm around them, as well as those who have long stood the climate in the West Indies, receive the contamination to which they are exposed far less rapidly than strangers, and are capable of communicating it from their clothes or persons to fresh men, without being in the least affected by it themselves; as appears to have been the case in various courts of justice, and particularly at the Black Assize at Oxford in July, 1577; though Dr. Bancroft has endeavoured to explain this effect in another way.*

The argument, however, of Dr. Musgrave upon this point, we have said, is not quite satisfactory; because he admits, that those who were about the patients, and paid no attention to personal cleanliness, did not wholly escape; but then, says he, they escaped *as generally*, and were *not more frequently* affected, than those who never entered the doors of an infirmary. Now, as all ranks and conditions, blacks and whites, even far off in the country, were affected indiscriminately, we have no reason to expect that those, whose habits had rendered them peculiarly torpid to the action of the febrile miasm, should be more frequently affected than others. The very admission that they were as much so, seems to imply, that the febrile miasm, was attacking them in some new mode against which they were not guarded by previous habit. Nor is it easy to conceive by what means the local disorder of the coast could be converted into so extensive an epidemic, unless through the medium of contagion.

I have dwelt the longer upon this subject, because it is desirable to reconcile, as much as possible, the conflicting testimony of respectable writers, who, having adopted different theories, are insensibly led to support them by inaccordant descriptions of the same disease.

In direct opposition to Dr. Musgrave, Dr. Jackson, Dr. Bancroft†, and a host of distinguished writers who think with them, we are told by Dr. Pym, that the Bulam fever, admitted by Dr. Musgrave to be the same as the above, not only is contagious, but is never introduced into any fresh region but by contagion‡: while Dr. Rush, speaking of the yellow fever of Philadelphia of 1793, asserts that “there were, for several weeks, two sources of infection, viz. exhalation and contagion. The exhalation,” says he, “infected at the distance of three and four hundred yards, while the contagion infected only across the streets. After the 12th of September, the atmosphere of every street in the city was loaded with contagion.” He adds, that a few caught the disease who had it before: thus taking a middle course between Dr. Musgrave, who tells us that recovery affords “no exemption from a second attack,” and Dr. Pym, who affirms that the fever “attacks the human constitution but once.” In the fever of Cadiz of the year 1800, Sir James Fellowes, who coincides in the view adopted by Dr. Pym, asserts, not only that it was contagious, and propagated only by contagion, but that the air, “from its stagnant state, became so

ORDER I.
Pyretica.
Remote causes.

Black Assize
of 1577.

Remarks on
Musgrave's
statement that
the Antigua
fever was not
contagious.

Counter state-
ments of other
writers.

* Essay on the Disease called Yellow Fever, &c. Lond. 1811.

† Ibid.

‡ Observations upon the Bulam Fever, which has of late years prevailed in the West Indies, on the coast of America, at Gibraltar, Cadiz, and other parts of Spain, &c. 8vo. 1815.

ORDER I.
Pyrectica.
Remote causes.

Atmosphere so
contaminated
at Cadiz as to
affect birds.

Similar fact at
Athens, as
stated by Thu-
cydides.

vitiated, that its noxious qualities affected even animals: canary birds died with blood issuing from their bills, and, in all the neighbouring towns which were afterwards infected, no sparrow ever appeared.”*

I do not remember to have seen this last fact so directly affirmed by any modern writer; but it is not contradicted in the course of the controversy, and is in perfect coincidence with the state of the air during the plague in most places†, and particularly at Athens, as described by Thucydides‡: τεκμήριον δὲ τῶν μὲν τοιούτων ὄρνιθων ἐπιλείψις σαφὴς ἐγένετο· καὶ οὐχ’ ἐωρῶντο οὔτε ἄλλας, οὔτε περὶ τοιούτων οὐδέν. Οἱ δὲ κύνες μᾶλλον αἴσθησιν παρείχον τοῦ ἀποβαίνοντος, διὰ τὸ ξυνδιατᾶσθαι. Whence Lucretius, who does but little more than translate Thucydides :

Nec tamen omnino temere illis solibus ulla
Comparabat avis, neque noxia secla ferarum
Exibant sylvis; languebant pleraque morbo,
Et moriebantur; cum primis fida canum vis
Strata animam ponebant in omnibus ægre:
Extorquebant enim vitam vis morbida membris.§

Nor longer birds at noon, nor beasts at night
Their native woods deserted; with the pest
Remote they languish’d and full frequent died.
But chief the dog his generous strength resign’d,
Tainting the highways, while the ruthless bane
Through every limb his sick’ning spirit drove.

Hence the
same fever pro-
duced by a like
miasm issuing
both from
human and
marsh effluvia.

There can be, or rather there ought to be, no question, therefore, that the fever before us was in some regions contagious, or produced from human effluvium; as, in other regions, and under other circumstances, it was produced from marsh effluvium. And, though, from a prejudice of education that will presently be pointed out, the contrary* is still contended for by names of considerable weight, they seem to be overbalanced in number as well as in authority, by those who have enlisted themselves on the opposite side of the question; of which last it may be sufficient to set down the names of Lind, Clarke, Belfour, Chisholm, Blane, M’Grigor, and Johnson, from among our own countrymen; and of Berthé, Bequine, Dalmas, Bally, and Pugnet, among foreigners. The facts brought forward by Sir James M’Grigor upon this subject are decisive, indeed, of themselves.|| And those who are more

* Reports of the Pestilential Disorder of Andalusia, which appeared at Cadiz in the years 1800, 1809, 1810, 1813, &c. 8vo. 1815. But, on the other hand, the reader should recollect what has happened subsequently with reference to the present question. In 1821 the city of Barcelona was visited by the yellow fever in a severe and extensively fatal character. Now, if the report of the French medical commission, sent out to investigate the nature of this disorder, be considered, and the facts related, be admitted, the contagious nature of the fever must be recognised. But, if the reader afterwards turn to the valuable documents collected by Dr. Chervin, he will be convinced that the facts, which led the commissioners to infer that contagion had been at work, are by no means conclusive; and he will be compelled to attribute the prevalence of the disease to local circumstances. — Ed.

† Diemerbr. de Peste, cap. vi. Van Swieten, ex prof. Sorbait, in sect. 1407.

‡ Hist. xi. 52.

|| Medical Sketches, passim.

§ De Rer. Nat., lib. vi. 1117.

voracious of proofs may satisfy the most exorbitant appetite by the numerous and conclusive narratives collected by Dr. Chisholm, and especially the fever described by Dr. M'Cabe*, as prevailing among the Royal York Rangers stationed at Trinidad. "The causes of this fever in its origin were, excessive heat, marsh effluvia from a marsh of immense extent in the immediate vicinity of Port of Spain, considerable labour and fatigue. Its contagious character superadded to its marshy was produced by an influx of Spaniards from the Spanish Main, in a deplorable state of misery and wretchedness. It was among these unfortunate people that the contagious fever began."†

It is probable that Sir James Fellowes and Dr. Pym might contend that, in this quarter, the fever was imported, and maintained by contagion alone, as they have contended was the case in the yellow fever of Cadiz in the year 1808; but, even in this last case, they have completely failed in establishing the question of its supposed importation by a ship's crew from Spanish America; and, as there is no doubt in the mind of those who have not buckled on the armour of controversy, that this fever was the common fever of the Mediterranean coasts, so well described by Dr. Cleghorn, and which, under different names and with different degrees of violence, commits its ravages mostly about the autumnal equinox, from the swampy shores of the Nile to the oozy banks of the Tiber, and which is often found as destructive in the Campania as in the East or West Indies, there should be no longer any doubt of the operation of one and the same miasm or febrile principle in all these cases; sometimes issuing from the effluvia of the living body, and sometimes from that of dead organised matter: generated, to adopt the language of Professor Frank, "*tam in ægotantium variorum corpore, quam in atmosphæra, plurimorum exhalationibus inquinata, favente anni constitutione*‡;" and, consequently, that the whole of that part of Dr. Cullen's system is erroneous which supposes a different specific principle of fever to be generated in each; the one distinguished by being limited to the production of uncontagious intermittent fever, and the other to that of contagious continued fever. And it is of the more importance that the error of this doctrine should be pointed out, since it has proved the very groundwork of that altercation which has prevailed upon the subject before us. For the writers on both sides, having equally drunk from the Cullenian fountain, and being equally impressed with the truth of this doctrine, have only warred with each other in support of Dr. Cullen's distinction; and, hence, those who have so clearly witnessed the origin of the fever from marsh effluvia, that they have been compelled to acknowledge this as its source, have felt themselves compelled at the same time to deny that it is contagious; while those who have as clearly witnessed its contagious power have as forcibly felt themselves compelled to deny that it has sprung from marshy miasm.

Dr. Jackson affords us one of the clearest proofs of the truth of this remark in his late, as well as in his earlier works. There is no writer, who has more distinctly pointed out the close analogy be-

ORDER I.
Pyrectica.
Remote causes.
Illustrated in
Trinidad.

And hence the fever of the Mediterranean and American coasts, in the East and West Indies, one and the same, only varied by incidental circumstance.

Hence Cullen's doctrine on this subject erroneous.

And the ground of the altercations that have arisen.

Illustrated in
Dr. Jackson.

* Edinb. Med. and Surg. Journ., Oct. 1819.

† Climate and Diseases of Tropical Countries, p. 42. 8vo. 1822.

‡ De Cur. Hom. Morb. Epit., tom. i. 8vo. March, 1792.

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Remote causes.

tween the symptoms of the marsh endemic of the West Indies, and contagious fever, as they very frequently show themselves, than he has done ; — “The derangements,” says he, “are exteriorly so much alike, that the discriminating characters cannot be delivered but with doubt and hesitation ; the result of the whole appearances will often determine the judgment, but the symptoms, separately considered, lead to no certainty. The causes of endemic and of contagious fevers were equally connected, under certain conditions, with eruptions on the skin, ulcers of the extremities, diarrhœa, purging, dysentery, or flux, fever of an intermitting or remitting form, of a form continued, — violent and rapid in course, moderate and of ordinary duration, or slow, lurking and irregular, ceasing and returning at intervals, — changing from general to local disease of various descriptions, and from local disease to general and formal fever. The general manner of attack, the course, changes and duration of endemic and contagious fevers have great similarity. Certain modes of action or combinations of action prevail more frequently in the one disease than the other, *but forms and modes do not constitute characteristic differences* : thus, affection of the stomach and biliary system, vomiting and yellowness, are less frequent in contagious than in endemic fever ; yet, they do occur in the former, and sometimes to considerable extent. Affection of the chest, alternating with delirium, or affection of the head, appears to be more common in contagious than in endemic fever ; so likewise is a peculiar maniacal derangement or lively delirium, occurring in the progress to recovery : yet the frequency of these appearances *does not furnish a characteristic mark*.”* That is to say, all the leading symptoms, which make and determine the diseases, are the same ; and though practically and in fact they run into each other and are the same, yet speculatively and theoretically they are not the same, and never can run into each other in the opinion of this valuable writer, because Dr. Cullen has laid down the dictum, that intermittents must proceed from paludism and be uncontagious, and contagious fevers from the morbid effluvium of animal bodies alone. Yet, after all, the substantive part of the tenet seems to be relinquished by Dr. Jackson in the following passage, which occurs in his remarks on the yellow fever that ravaged the Spanish coasts in 1800, notwithstanding the firmness with which the Cullenian doctrine is ostensibly maintained. “The case may perhaps be thus explained. The yellow fever, during the reign of epidemic influence, often *strikes like a pestilence by the mere concurrence of people in a close place* ; and if a mass of sick persons be collected into a hospital during the epidemic season, *the common emanations from the sick bodies, whether saturated with contagious particles or not, often act offensively on those who enter the circle*, and often appear to be the cause of the explosion of a disease, which, without accessory or changed condition of the medium in which man lives, would have probably remained dormant for a time, and perhaps for ever.”†

In the typhus, or the fever that originates in crowded gaols, and other thronged and noisome abodes, there is no longer a question

How far
typhus approx-
imates to yellow
fever.

* History and Cause of Fever, pp. 213, 214. 216.

† Remarks on the Epidemic Yellow Fever, &c. on the South Coasts of Spain, p. 44. Lond. 8vo. 1821.

concerning its human origin, or emanation from sick bodies, and its contagious property; at least, among practical writers. But typhus does not differ more widely in its symptoms from some of the modifications of the fever we have just contemplated, than such modifications do from others of the same fever, varied by the varying power of its co-operating agents.* And hence we have reason to conclude, that typhus also is generated from the same common febrile miasm, modified in its action by influential contingencies.

In effect, the yellow fever itself under peculiar circumstances, assumes something of a typhous character even in its first origin, and where the source has unquestionably been marsh miasm. The second form of the Andalusian fever, as described by Dr. Jackson, and especially characterised by defective energy, peculiarly exemplifies this remark; and such was expressly the case with the asthenic remittent at Breslaw in 1757†, as well as in the island of Edam on the coast of Batavia in 1800, and is still oftener found in the remittent that takes place along the Gambia, after rain in the spring or early part of the summer; when there is less organised matter remaining on the surface of the earth to be decomposed, and what there is has been acted upon by a lower temperature and a shorter duration of heat than in the autumn. "In the month of June," says Dr. Lind, "almost two-thirds of the white people were taken ill. Their sickness could not well be characterised by any denomination commonly applied to fevers: it however approached nearest to what is called a *nervous fever*, as the pulse was always low, and the brain and nerves seemed principally affected. It had also a tendency to frequent remissions." The patients were often attacked with a delirium, and ran into the open air, where they received benefit from an affusion of heavy rains upon their naked bodies. The delirium, however, it seems, "soon returned; they afterwards became comatose, their pulse sunk, and a train of nervous symptoms followed; their skin often became yellow." And even where the disease commenced with symptoms of great excitement, and an intermittent type, it is so much disposed, under peculiar incidents, as great fatigue, disappointment, and short provisions, to run into a typhus fever, as at Walcheren‡, and during the retreat of the British army to Corunna, that many nosologists have thought themselves called upon to make this form a distinct variety or even species of fever, which they have usually distinguished by the name of *typhus icterodes*, or yellow typhus.

In like manner, where the yellow fever has commenced originally from contagion, or, in other words, from a decomposition of human instead of marsh miasm, it has been under the very same auxili-

ORDER I.
Pyrectica.
Remote causes.

A modified offspring from the same common miasm.

Yellow fever itself often typhous from the first.

But more frequently in its progress.

Both originate in similar situations.

* Caizerques, Mémoires sur la Contagion de la Fièvre Jaune, Paris.

† Chisholm, Manual of the Climate and Diseases of Tropical Countries, &c. p. 38. 1822.

‡ Id. *ibid.* Here the change of an intermittent fever to typhus is accounted for by the author himself, without any necessity for having recourse to the hypothesis that the infectious principles of malaria from decaying vegetables, and of animal exhalations, may give rise occasionally either to continued or intermittent fevers. What is stated in the text merely proves, that a person labouring under ague, if exposed to fatigue, disappointment, certain privations, &c., may become typhoid. — ED.

ORDER I.
Pyrectica.
Remote causes.

aries of filth, poverty, crowded numbers, and a stagnant atmosphere, that give rise to typhus. Thus, the fever of Malaga in 1803, uniformly admitted to be of the same kind as that of Cadiz in 1800, spread first, according to Professor Arejula's description, through the narrow, crowded, and offensive lanes of the district de Perchel; and that of Cadiz itself, according to Sir James Fellowes made its earliest appearance in the Barrio de Santa Maria, a part of the town in which the streets are narrower, less ventilated and cleanly than any other part, and where the poorer inhabitants, dirty in their persons, and crowded in filthy rooms, generally live together. It is true, that it was conjectured by many persons, and among others by both these writers themselves, that the contagion did not originate in either of these situations, but was introduced into them by foreign shipping; but such a conjecture has, in the first place, no trustworthy evidence for its support; and, in the second, the mere testimony of the captain of the ship referred to was directly contradicted by the chief physician of the hospital at the Havannah, who was on board the whole time, and was privy to the cases in question. In effect, a cause thus secondary seems to have been superfluous; for the local causes, enumerated by Sir James Fellowes and Professor Arejula* appear to have been perfectly adequate. They are, as near as may be, the same as those which operate so fatally on the miserable and crowded cabins of Ireland; and if the fever had shown itself at a cooler season of the year, and the subjects of it had been still more broken down in constitution by mental dejection and low diet, it would probably from the first have assumed a continued and typhous character, instead of a remittent and more energetic. The proofs offered upon this subject, from personal and accurate observation, by Dr. Jackson and Dr. O'Halloran, are in full confirmation of this view; for there can be no doubt that the fever of 1820 and 1821, which they describe, was the same as that of 1800 and 1803.

Cause of their
difference.

Further illus-
trated from the
late fevers in
Spain.

"From an impartial consideration," says Dr. O'Halloran, "of all the circumstances attending the epidemics of Spain in the year 1821, the conclusion is, I think, fairly deducible, that the disease was not, and is not occasioned by imported contagion, and that its origin cannot be attributed to the germ of a former epidemic, resuming original activity from the operation of a peculiar state of atmosphere, without which it would remain dormant, perhaps, for ever. All the towns and cities which suffered from the yellow fever, were, with the exception of Cadiz, filthy in the extreme, disgustingly so, and very objectionable on the score of ventilation, situation, and form of construction; while the different towns of Arens, Matero, Badalona, Tarragona, Vinaros, Benicarla, Valencia, Aliama, Velez, Malaga, Marabella, Estepona, Vejer, Conil, Puerto Real, Rota, Chipiona, Orcos, and Medina Sidonia, — all of which are in the vicinity of the sea, and which, it may be presumed from their relative situations, communicate freely with the theatres of disease, were not affected by the malady. They seldom, indeed, suffered in any other years; because, independent of their local-

* Brieve Descripcion de la Fiebre Amarilla, p. 229. Madrid, 1806.

ities, being better chosen for health, they are comparatively clean."*

The febrile miasm, then, generated by a decomposition of human effluvium and of dead organised matter, appears to be essentially the same, modified alone in one or two of its qualities by the co-operation of the heat, moisture, stagnant atmosphere, and perhaps some other unknown agents, that are necessary to give it birth or activity.

The chief difference produced in this miasm under these distinct modes of origin, is, that when generated by the decomposition of effluvium issuing from living human bodies, it is less volatile†, and has at the same time a power more directly exhausting, or debilitating the sensorial energy, than when generated by the decomposition of dead organised matter. Whence fevers, originating in jails or other confined and crowded scenes, contaminate the atmosphere to a less distance than those from marshes or other swamps, but act with a greater degree of depression on the nervous system when once received into it. Yet, even the latter have a definite atmosphere of action, beyond which they lose their power, and an atmosphere of a more limited diameter than we might at first be tempted to conceive: for, we learn from Sir Gilbert Blane, that, in the unfortunate expedition to Walcheren, the crews of the ships in the road of Flushing were entirely free from the endemic of the country, as were also the guard-ships, which were stationed in the narrow channel between Flushing and Beveland;—the width of which channel is only about six thousand feet."‡

In whatever mode derived, the remark of my excellent and distinguished friend Dr. Hosack will still hold, not indeed that it is altogether incapable of taking effect in a pure atmosphere, but that "an impure atmosphere is indispensably necessary to extend the specific poison."§ And I should also fully concur with him and Professor Brera|| in censuring the application of the term *epidemic* to any of the febrile diseases hereby produced, provided this epithet were usually confined, which I am not aware of, to disorders supposed to result from some primary intemperament of the atmosphere itself; and provided also every attempt at distinction were not likely to perplex, rather than to simplify, a subject

ORDER I.

Pyrectica.

Remote causes.

Miasm from human effluvium and dead organised matter decomposed essentially the same, but modified in some of its properties.

Chief differences between them.

Impure air necessary for an extensive spread.

* Remarks on the Yellow Fever on the South and East Coasts of Spain, &c. By Th. O'Halloran, M.D. &c. p. 184. Lond. 8vo. 1823. Dr. Haygarth believed that the contagion of fever is confined to a very narrow sphere (Letter to Dr. Percival, p. 8.); and Dr. Clarke is of opinion, that the most malignant fever does not render the atmosphere infectious further than a few feet from the patient, or from the contagion retained in the clothes or furniture. (Report of the Committee of the Newcastle Dispensary, 1802.) The plague is sometimes alleged to be infectious to so small a distance from the sick person, or infected articles, as almost to require contact for its propagation. It is probable, as Dr. Brown thinks, that these limits of the extent of the action of contagious disorders have been fixed with more minuteness, than facts altogether justify. — ED.

† Hist. and Cure of Fever, by R. Jackson, M.D., part 1. chap. III. p. 102.

‡ Select Dissertations, &c. p. 107.

§ Obs. on the Laws governing the Communication of contagious Diseases, 4to. New York, 1815.

|| De' Contagi e della Cura de' loro Effetti, Lezioni Medico-pratiche del Cavaliere Brera, M.D., &c. 2 vols. 8vo. Padua, 1819.

ORDER I.

Pyrectica.

Remote causes.

Why an impure atmosphere necessary.

Explanation of Hosack.

Of Chishelm.

Exp'lation offered by the author.

Objections avoided by this explanation.

Origin and laws of febrile miasm.

sufficiently intricate *ab ovo*; of which M. Devèse has furnished us with an ample specimen in his late treatise.*

Why a corrupt state of the atmosphere should be necessary to the general action of the febrile miasm, is a question which still remains to be discussed. Dr. Hosack supposes that the latter "produces its effects by some chemical combination with the peculiar virus secreted from the diseased body," and which is floating in the atmosphere; of the nature of which virus, however, he has not given us any information: while Dr. Chishelm conceives, that it is the impurity of the atmosphere itself, which operates by "increasing the susceptibility of the system to the action of the poison introduced."† But to this explanation Dr. Hosack successfully rejoins, "that the predisposition of those who are most exposed to such impure air is less, while those, who reside in the pure air of the country, are most liable to be infected when exposed to the contagion."

In a pure atmosphere, the miasmatic materials easily become dissolved or decomposed; but slowly and with great difficulty, perhaps not at all, in a corrupt atmosphere, already saturated with foreign corpuscles. In a state thus crowded, moreover, they less readily disperse, or ascend beyond their proper periphery of action, and, perhaps, by their tenacity adhere to bodies more ponderous than themselves, and thus loiter for a still longer period within the stratum of human intercourse. And as it is from the same tenacity they adhere to various kinds of clothes and filth, we may easily perceive why, on the shaking or agitation of such substances, as in clearing a ship's hold, or unpacking its cargo, a pestilence may be generated of which the crew have hitherto given no signs.‡

Upon this explanation it is not necessary to suppose that febrile miasm has a power either of concentrating its virulence §, so as to render itself more active; or of multiplying its own form, so as to increase its numerical strength; against both which views there are weighty objections. Every distinct particle thus suspended, and withheld from dissolution, becomes an active individual in the field of battle, and is almost sure to grapple with its man. So that hereby alone we have a force, equal to any degree of mortality that can be conceived.

While, then, the remote causes of fever are of different kinds, its chief and most effective is febrile miasm; the origin and laws of which, so far as we are at present acquainted with it, may be expressed in the following corollaries:—

1. The decomposition of dead organised matter, under the influence of certain agents, produces a miasm that proves a common cause of fever.

2. The whole of these agents have not yet been explored; but, so far as we are acquainted with them, they seem to be the common auxiliaries of putrefaction, as warmth, moisture, air, and rest, or stagnation.

3. The nature of the fever depends, partly, upon the state of the body at the time of attack; but, chiefly, upon some modification

* *Traité de la Fièvre Jaune*, p. 354. 8vo. Paris, 1820.

† Letter to Haygarth.

‡ Blanc, *Select Dissertations*, &c. p. 307. Lond. 1822.

§ Jackson, *ut supra*, part i. chap. x. p. 246.

in the powers or qualities of the febrile miasm, by the varying proportions of these agents, in relation to each other, in different places and seasons. And hence, the diversities of quotidian, tertians, and quartans, remittent and continued fevers, sometimes mild and sometimes malignant.

4. The decomposition of the effluvium, transmitted from the living human body, produces a miasm similar to that generated by a decomposition of dead organised matter, and hence capable of becoming a cause of fever, under the influence of like agents.

5. The fever thus excited is varied, or modified, by many of the same incidents that modify the miasmic principle when issuing from dead organised matter; and hence a like diversity of type and vehemence.

6. During the action of the fever thus produced, the effluvium from the living body is loaded with miasm of the same kind, completely elaborated as it passes off, and standing in no need of a decomposition of the effluvium for its formation. Under this form, it is commonly known by the name of febrile contagion. In many cases, all the secretions are alike contaminated; and hence febrile miasm of this kind seems sometimes to be absorbed, in dissection, by an accidental wound in the hand, and to excite its specific influence on the body of the anatomist.

7. The miasm of human effluvium is chiefly distinguishable from that of dead organised matter, by being less volatile, and having a power of more directly exhausting or debilitating the sensorial energy, when once received into the system. Whence the fevers generated in gaols, or other confined or crowded scenes, contaminate the atmosphere to a less distance than the emanations from marshes and other swamps; but act with a greater degree of depression on the living fibre.

8. The more stagnant the atmosphere, the more accumulated the miasmic corpuscles, from whatever source derived; and the more accumulated these corpuscles, the more general the disease.

9. The miasmic material becomes dissolved or decomposed in a free influx of atmospheric air: and the purer the air, the more readily the dissolution takes place: whence, *è contrario*, the fouler as well as more stagnant the air, the more readily it spreads its infection.*

* In relation to this subject, it deserves attention, that certain other states of the atmosphere affect different contagious disorders in different ways: "the diffusion of plague, for instance, is favoured by a temperature high within a certain degree; whilst it is checked, if not altogether extinguished, by the cold of winter, and likewise by very high temperatures, such as the heat of certain parts of Africa in summer, as mentioned by Alpinus, and that of the Harmattan winds. Typhus, we know, prevails at low degrees of heat, as likewise do measles and scarlatina; and so, with regard to contagions in general, we find the effect of temperature on them varies in the case of different diseases. A moist and still atmosphere may, if we mistake not, be declared favourable to the propagation of all contagious disorders; whilst it is sometimes suddenly checked by strong commotions in the air, such as storms and hurricanes. But, besides these appreciable atmospheric states, which, in one way or another, influence the diffusion and action of the matter of contagion, there are conditions of the air favourable to its diffusion, or otherwise, of the real nature of which we are ignorant, beyond their influence over the propagation of the disease. It has occurred to every medical man to see diseases, justly considered contagious, unusually prevalent in one season compared with another, though there may have been no discoverable difference in the

ORDER I.
Pyrectica
Remote causes.

10. Under particular circumstances, and where the atmosphere is peculiarly loaded with contamination, the miasm that affects man is capable also of affecting other animals.

11. By a long and gradual exposure to the influence of febrile miasm, however produced, the human frame becomes torpid to its action *, as it does to the action of other irritants: whence the natives of swampy countries, and prisoners confined in goals with typhous contamination around them, are affected far less readily than strangers; and, in numerous instances, are not affected at all.

12. For the same reason, those who have once suffered from fever of whatever kind hereby produced, are less liable to be influenced a second time; and, in some instances, seem to obtain a complete emancipation.

Doctrine of
crises.

It only remains to offer a few remarks upon the DOCTRINE OF CRISES; or that tendency, which fevers are by many supposed to possess, of undergoing a sudden change at particular periods of their progress.

Crisis, what,
in the present
day.

Primary mean-
ing and use of
the term.

Critical dis-
tinctions of
Frank.

Crisis often
occurring in the
modern sense
of the term.

Whether in the
ancient sense,
or on critical
days.

A sudden and considerable variation of any kind, whether favourable or unfavourable, occurring in the course of the general disease, and producing an influence on its character, is still loosely expressed by the name of crisis. The term is Greek, and pathologically imports a separation, secretion, or excretion of something from the body; which was in truth the meaning ascribed to it when first employed, agreeably to the hypothesis of concoction which we have just considered. The original hypothesis is abandoned; but the term is still continued in the sense now offered. "If the matter of the disease," says Professor Frank, "be expelled by some one convenient outlet, in the skin, kidneys, bowels, or blood-vessels, the crisis is simple; if by several of these at the same time, it is compound; if the whole be carried off at once, it is perfect. If it be carried off at different times, it is a *lysis* †, or resolution."

That changes of this kind are perpetually occurring in the progress of continued fevers, must, I think, be admitted by every experienced practitioner. Nothing is more common than to behold a patient suddenly and unexpectedly grow decidedly better or worse in the progress of a fever of almost any kind, and pass on rapidly towards a successful or an unsuccessful termination.

But the important question is, whether there be any particular periods in the progress of a fever, in which such changes may be

atmospheric states to explain this variety in their prevalence; and to see them, on the other hand, decline and finally disappear long before individuals, susceptible of the contagion, were scarce, and without there having been any appreciable change in the air to account for that in the state of the disease. This atmospheric peculiarity, to which the name *epidemic constitution* has been assigned, occasionally appears to possess a limited locality; for, we find a contagious disease prevailing in a town or village, whilst places in the neighbourhood escape, though there is a constant intercommunion between the infected and healthy districts: or, such a disease may spread extensively in one town, whilst, in another, similar as to the habits and characters of the population, and not remote in situation, it may exist, but be by no means so prevalent." See Cyclop. of Pract. Med., art. CONTAGION.—ED.

* Brera, De' Contagi e della Cura de' loro Effetti, &c. ut suprâ, Padua, 1819.

† De Curandis Hominum Morbis Epitome, &c. tom. i. De Febr. p. 26.

expected? Hippocrates conceived there were: he endeavoured to point out and distinguish them by the name of critical days. Asclepiades and Celsus denied the existence of such periods; and the same diversity of opinion has prevailed in modern times.

It is not very easy to determine the point at the present day, and especially in our own country. For, first, fever, like many other complaints, may have undergone some change in its progress from a like change in the nature of its remote causes, or in the constitution of man. And next, it seems to be generally allowed, that sudden transitions, whether regular or irregular, are more apt to take place in almost all diseases in warm, than in cold climates. On these grounds, it is probably a subject which will never become of great practical importance at home. Yet, it is well worthy of attention as a question of history, and one that may yet be of great importance to many parts of the world.

If we examine the phenomena of the animal economy, as they occur in a natural series, we shall find, that they are in almost every instance governed by a periodical revolution. A man in a state of health and regular habits generally becomes exhausted of sensorial power within a given period of time, and requires a periodical succession of rest; his appetite requires a periodical supply; and his intestines a periodical evacuation. This tendency equally accompanies and even haunts him in disease; he cannot disengage himself from it. Gout, rheumatism, mania, rapidly and pertinaciously establish to themselves periods of return. The hemorrhoidal discharge often does this; and the catamenia constantly. The same occurs in fevers, but especially in intermittents; for the quotidian, the tertian, the quartan, have, upon the whole, very exact revolutions. And, though accidental circumstances may occasionally produce a considerable influence on every one of these facts, whether morbid or natural, the tendency to a revolutionary course is clear and unquestionable.

Now, although Hippocrates has not appealed to this reasoning, it forms a foundation for his observations: and, when stript of the perplexities that encumber his writings upon this subject, partly produced by erroneous transcripts, and, in a few instances, perhaps, by his own irresistible attachment to the Pythagorean hypothesis of numbers, he may be regarded as laying down the following as the critical days of continued fever: the 3d, 5th, 7th, 9th, 11th, 14th, 17th, 20th; beyond which it is not worth while to follow the series; for it is not often that they extend further.

In other parts of his works, he regards also the 4th and 6th, and even the 21st, as critical days; so that in the first week, every day, after the disease has fully established itself, evinces a disposition to a serious change; in the second week, every other day; in the third week, every third day. It is not easy to determine, why the 21st day should be a critical day, as well as the 20th. Various conjectures have been offered upon the subject; by some, it has been regarded as a mistake in the Greek copy, and by others, as a piece of favouritism in Hippocrates for this number, in consequence of its being an imperfect one in the Pythagorean philosophy, as the commencement of a septenary.

De Haen, with rigid and patient assiduity, has put Hippocrates to the test upon these data; for he has accurately analysed Hip-

ORDER I.
Pyrectica.
Doctrine of
crises.

Not easy to
determine in
cold climates.

Periodical
revolutions in
all the pheno-
mena of the
animal econ-
omy.

Examples of
this remark.

They support
the observations
of Hippocrates
upon critical
days.

Critical days
of Hippocrates.

Hippocrates
put to the test
by De Haen.

ORDER I.
Pyretica.
Doctrine of
crises.

Critical days of
Hippocrates
accounted for
upon the types
of different
intermittents.

The subject
confirmed by
Cullen's expe-
rience,
and Fordyce's.

Still less dis-
tinct in cold
than in hot
climates.

Difficulties
attending the
subject.

pocrates's own journal of the numerous cases of fever he has so industriously collected and recorded, and finds the positions, in most instances, to be strictly justified; and that out of 168 terminations of fever, not less than 107, or more than two-thirds, happened on the days denominated critical, not reckoning the 4th, 6th, or 21st, and that the 4th and 6th were very frequently critical. There are a few anomalies; but it is not necessary to notice them, because they are easily referable to accidental causes, similar to those that retard, or accelerate, the paroxysm of intermittent fevers.

Now, admitting the Hippocratic table to be true, the continued fever, in its progress, is measured by the various types exhibited by intermittent fevers. Thus, the quotidian prevails through the first seven days; there is on each day a slight exacerbation, and no one day is more critical than any other. After this period, the tertian type commences, and runs through the ensuing week; the principal changes occur on the 9th and 11th days, and would occur on the 13th, but that the quartan type now assumes its prerogative; and the principal transitions, after the 11th, take place on the 14th, instead of on the 13th; on the 17th; and on the 20th. Dr. Cullen, who has examined this subject with great attention, and simplified it from many of its difficulties, directly asserts, that his own experience coincides with the critical days of Hippocrates. Dr. Fordyce, who scarcely does justice to Cullen upon other points, unites with him upon the present, and justly compliments him upon his ingenious examination and explanation of the Greek distribution of critical days; and Dr. Stoker of Dublin has arrived at a like conclusion, after what appears to have been a very patient, discriminating, and extensive enquiry.* It is, nevertheless, admitted on all hands, that the order of succession is far less distinct, as well as less regular, in cold, than in warm climates; and that it requires a thoroughly attentive and practised eye to notice these changes in our own country, or, indeed, in any part of northern Europe. And hence, Craanen says, it is lost time to look for them †; Stoll, that they are only to be found in inflammatory fevers ‡; Le Roy, that the supposed critical days have no influence, and can lead to no prognosis or peculiarity of practice §; and Frank, that nature has fixed upon no one day rather than another, for a solution of fever, nor at any time forbids our attempt at executing a present indication. || Dr. Jackson, partly from the strength of his attachment to the doctrines of Cullen, and partly from having principally practised in hot climates, is a great advocate for the existence of critical days, and believes them to take place in fevers from human as well as marsh miasm; though less distinctly as also less frequently in the former, than in the latter. ¶ Why the first week of a fever should incline to a quotidian type rather than to a tertian, or the second to a tertian rather than to a quartan, we know no more than we do why

* Medical Report of the Fever Hospital, &c. for 1816. Trans. of the King's and Queen's Coll. Dubl., vol. ii. p. 434. 8vo. 1824.

† De Homine.

‡ Rat. Med., part iv. p. 283.

§ Du Pronostic dans les Maladies Aigues, 8vo. Montpel. 1778.

|| De Curandis Hom. Morbis Epit., tom. i. 29.

¶ Hist. and Cure of Fever, part i. ch. ix. p. 242.

fevers should ever intermit, or at any time observe the distinctions of different types. We are in total ignorance upon all these subjects. We see, moreover, that intermitting fevers, whether quotidian, tertian, or quartan, have their paroxysms recur regularly in the day-time; the quotidian in the morning, the tertian at noon, and the quartan in the afternoon; and that, in no instance, do the paroxysms take place at night: and we see also that, in continued fevers, the exacerbations uniformly take place later in the day, than the paroxysms of the latest intermittent; for these rarely occur later than between five and six o'clock in the evening, while the paroxysms of the quartan return commonly before five. Of these interesting and curious scenes we are spectators; but we are nothing more; for we are not admitted to the machinery behind the curtains.

By some pathologists, the source of these phenomena is sought in the influence of the heavenly bodies, and especially in those of the sun and moon. In ancient times, these luminaries were supposed to produce an effect on all diseases, and especially on mania, epilepsy, catamenia, and pregnancy. And when the Newtonian philosophy first illumined mankind with the brilliant doctrine of universal attraction, Dr. Mead stepped forth into the arena, and revived and supported the ancient doctrine with great learning and ingenuity: and as an ingenious conjecture and possible fact, of which no practical use could be made, it was contemplated till towards the close of the last century: about which time Dr. Darwin, by interweaving it with his new hypothesis, once more endeavoured to raise it into popular notice, and gave it an air of serious importance. Dr. Balfour, of British India, however, has still more lately brought it forward as a doctrine capable of direct proof, and as peculiarly affecting the progress of fevers. His opinion, which he endeavours to support by weighty facts and arguments, is, that the influence of the sun and the moon, when in a state of conjunction, which is named *sollunar influence*, produces paroxysms or exacerbations in continued fever, in all cases in which a paroxysmal diathesis (for such is his expression) exists; and as this influence declines, in consequence of the gradual separation of these luminaries from each other, and their getting into a state of opposition, a way is left open to the system for a critical and beneficial change, which is sure to take place, provided the critical disposition is at this time matured. In other words, paroxysms and exacerbations in fever may be expected to take place (and do in fact take place) at spring-tides, and crises at neap-tides.

This is a new view of the influence of the heavenly bodies upon the human frame; and a view which, though feebly supported by facts, is advanced with all the dogmatism of an established science. Dr. Stoker, at the particular request of Dr. Balfour, put his doctrines to the test of 276 patients between July 6. and September 6., 1817, in Dublin. He has candidly given us his tables, and as candidly observes, that "very little coincidence indeed is to be remarked from a view of these tables."* There is, nevertheless, more in medical astrology than is, perhaps, generally supposed; it is an important branch of meteorology, and, as such, is well worth studying. Nor can there, I think, be a question in any impartial

ORDER I.
Pyrectica.

Crises referred to the influence of the heavenly bodies.
Their influence, in the opinion of the ancients.

Of Darwin;
of Dr. Balfour.

General remarks.

* Trans. of the King's and Queen's Coll. Dublin, vol. ii. p. 435. 8vo. 1824.

ORDER I.
Pyrectica.

mind, that, *under certain circumstances*, and especially in tropical climates, many diseases are influenced by lunation, as we are sure they are, in all climates, by insolation. The concurrent observations of a host of candid and attentive pathologists, who have been witnesses of what they relate, are sufficient to impress us with this belief: but, till we know more fully what these *circumstances* are, we cannot avail ourselves of their remarks, and can only treasure them up as so many isolated facts. And hence, in no age or country whatever has the study been turned to any practical advantage, expedited the cure of a disease, or enabled us to transform the type or interval of one kind of fever into that of another. Nor is it any exclusive reproach to the art of medicine that it should be so; for, of all the subdivisions of general philosophy, there is none so little entitled to the name of a science as meteorology itself. And, till the naturalist has explained the variations of the barometer, the physician need not blush at being incapable of turning to account the supposed influence of the planets, or of unfolding the origin, or tracing the capricious courses, of epidemics and pestilences.*

* It is remarked by Dr. Copland, that, since the overturn of the humoral pathology, the doctrine of critical evacuations has undeservedly fallen into disrepute. In our own country, at the present time, he thinks too little attention is paid to these evacuations, and still less to the periods at which they occur. "In temperate climates, a number of diseases, particularly fevers, run on for certain periods with regularity, and, after an exasperation of the symptoms, or some violent perturbation of the economy, terminate by evacuations of different kinds, which tend to remove the train of morbid actions, and to restore the healthy functions. In other cases, the exasperation of the disorder is followed by imperfect evacuations, occurring in an irregular manner; whilst, in some, it gives rise to additional phenomena of a dangerous or fatal character. Hence *crises* have been denominated *salutary, complete, imperfect, and fatal.*" (Dict. of Pract. Med., art. *CRISES.*) Yet, it has been observed, that the crisis of fever often takes place without sensible evacuation; notwithstanding it is, in a large proportion of cases, preceded or accompanied by some change in the secretions, or by diarrhœa, or hemorrhage. In the progress of fever, the urine exhibits particular changes. In the early stages, its quantity is lessened, but there is no change in its colour or chemical properties. "As the symptoms advance, the urine becomes darker in colour, but does not deposit a sediment till the fever begins to decline, when it is increased in quantity, and deposits a cloud or sediment on cooling. This urinary deposit, which is sometimes copious, appears in the bottom of the vessel some hours after the urine has been voided: from its resemblance to brickdust it has been called *lateritious*, and by evaporation it may be collected in minute crystals of lithate of ammonia. This sediment is by no means peculiar to patients labouring under fever, but is often observed in the urine of healthy persons, or in that of others, whose function of digestion is impaired. In other instances the sediment is of a pinkish white colour, and to this deposit, which, according to Dr. Wilson Philip, consists of the phosphates of the urine, the term *furfuraceous*, or *branny*, has been given. He regards both these urinary deposits as indications of returning health, and particularly of a renewal of a free secretion by the skin, which, in fevers, is generally a favourable symptom. In some fevers, terminating favourably, there is an unusual tendency to sweat, which only exhausts the strength. In these the *furfuraceous* sediment is observed, but without removing the fever: this is the case in hectic fever." (Cyclopædia of Pract. Med., art. *FEVER.*) Amongst other remarks made by Dr. Tweedie, he says, that when the sweating is so profuse as to induce exhaustion, or when it is partial or clammy, it is unfavourable; and though as a general rule critical sweats should not be interfered with, yet, if the strength be evidently lowered by them, or if there be not a corresponding amendment in the general symptoms, they should, if possible, be checked. When moderate diarrhœa comes on towards the termination of fever, it is generally a favourable circumstance

GENUS I.

EPHEMERA.

DIARY FEVER.

ONE SERIES OF INCREASE AND DECREASE; WITH A TENDENCY TO EXACERBATION AND REMISSION, FOR THE MOST PART APPEARING TWICE IN TWENTY-FOUR HOURS.

THIS is the simplest form, in which fever at any time makes its attack; and hence, Dr. Fordyce has distinguished it by the name of SIMPLE FEVER. It is probably that which is intended by the term *essential fever*, as used by the French writers. It is, in truth, the basis of all other fevers; which are hence arranged by Elsner as mere species of this.* For the purpose, however, of entering into the full character, not only of the present, but of all the subsequent genera, and their respective species, it is necessary to bear in mind, that the ordinal definition forms a part of that character, and is essentially included, in a less or greater degree, in all the subdivisions that appertain to it.

The ephemera rarely exceeds a duration of twenty-four hours. Some practitioners, however, have called by this name a fever that has extended to three days; and Sauvages has arranged this mode of fever under his own genus of ephemera, as has also Professor Frank, distinguishing the proper ephemera by the adjunct *simplex*, and its elongated form by that of *protracta*.† But this is to confound different species under one generic name. Fordyce asserts, that he has often seen the ephemera commence its attack with all the essential appearances of fever, and terminate in eight, ten, or twelve hours.‡ And hence, in defining ephemera, the symptom of duration ought not to exceed the limit here allotted to it.

GEN. I.
The simple fever of Fordyce.
Essential fever of French writers.

The term has been erroneously applied.

and ought not to be stopped. When there has been a disposition to relaxation of the bowels throughout the disease, which is not uncommon in some epidemics, and at particular seasons, the irritation commonly subsides spontaneously. Should it even continue through the period of convalescence, provided it do not interfere with the recovery of the patient, it is only necessary that the diet and general management be regulated. When the diarrhoea appears to retard recovery, and produce gradual emaciation, the practitioner should never lose sight of the possibility of the affection being the result of inflammation of the mucous membrane of the bowels, or of other intestinal lesions, and therefore requiring the most vigilant care. Dr. Tweedie has not met with hemorrhage as a crisis of fever: he has, indeed, seen hemorrhage from the nose, when there was considerable cerebral affection, and always remarked great relief from the evacuation; but he has never known an instance in which the fever disappeared with epistaxis. In typhoid fevers, hemorrhage from mucous surfaces and from the skin (*petechiae*) is not unusual; but, according to Dr. Tweedie, they are never critical: they reduce the patient still more, and always indicate a severe, if not a fatal, form of fever. — Ed.

* Beyträge zur Fieberlehre. Königsb. 8vo. 1789.

† De Cur. Morb. Hom. Epit., tom. i. pp. 156. 185. 8vo. Mannh. 1792.

‡ On Simple Fever, Diss. i. p. 33.

GEN. I.
Ephemera.
Stages of diary
fever, three.

In this simple shape of the disease, the pathognomonic symptoms are few and striking; for, however violent, it is confined to a single paroxysm of three distinct stages, shivering or languor, heat, and perspiration; each most probably dependent on the other, and ceasing, when true to itself, after having followed up the movements of the animal frame through a single diurnal revolution. The cold stage, however, is often scarcely perceptible, and sometimes altogether imperceptible, the general languor taking place without it.

The genus exhibits two common and very distinct species; and if the ephemeræ *sudatoria* of Sauvages, the sweating-sickness or English plague of other authors, be regarded as belonging to it, as unquestionably it ought, it will then afford us another after the manner following:—

| | |
|---------------------|--------------------|
| 1. EPHEMERA MITIS. | MILD DIARY FEVER. |
| 2. ————— ACUTA. | ACUTE DIARY FEVER. |
| 3. ————— SUDATORIA. | SWEATING FEVER. |

SPECIES I.

EPHEMERA MITIS.

MILD DIARY FEVER.

WITHOUT PRECEDING RIGOR; LASSITUDE AND DEBILITY INCONSIDERABLE; PAINS OBTUSE, CHIEFLY ABOUT THE HEAD; HEAT AND NUMBER OF THE PULSE INCREASED SLIGHTLY; DRYNESS OF THE TONGUE AND FAUCES; TERMINATING IN A GENTLE PERSPIRATION.

GEN. I.
SPEC. I.
Causes.
The fever frequent from one or other of these causes.

The common exciting causes are, excess of corporeal and especially of muscular exertion; long protracted study; violent passion; suppressed perspiration; sudden heat or cold.

There are few persons who have not felt this species of diary fever at times, from one or other of the causes just enumerated. When a man has worked himself up into a violent and long continued fit of wrath, whether there have been reason or no reason, and more especially in the latter case; when he has taken a long and fatiguing journey on foot, walking with great speed, and suffering beneath great heat and perspiration; or when he has devoted the whole of the day to a particular study, so profound and abstracting as to exhaust almost the entire stock of sensorial power that can be drawn from other parts of the system, at the single outlet of the attention;—and when, beyond this, he still urges his abstruse and protracted train of thought into a late hour of the night or the morning—there is a general irritation or undue excitement produced, that simple rest cannot at once allay; his sleep is short, hurried, and interrupted, if he sleep at all; he yawns, stretches his limbs, turns himself again and again in his bed for an easy, perhaps for a cool place, for his skin is hot and dry; but for a long time he turns in vain. The morning strikes upon his eyes, but he has had little

Description.

sleep, and no refreshment: he is indisposed to leave his bed; and if he rise, he is still feverish, and unfit for business. He passes the day in disquiet, which perhaps increases towards evening; but at night he feels a moisture breaking forth over his skin, and comfortably succeeding to the heat and dryness that have thus far distressed him; he recovers perhaps even while sitting up; but if, as he ought to do, he goes to an early bed, a quiet and refreshing sleep supervenes, and he wakes to the health he before possessed.

It is not easy to explain why the febrile paroxysm should be more disposed to close its career sometimes towards the evening, but more generally later at night, except for the reason, whatever that reason may be, that all fevers are far more apt to commence their paroxysms in some part or other of the daytime, and especially intermittents, and consequently to drop them, as the day declines. Thus, the quotidian makes its assault in the morning, the tertian at noon, and the quartan in the afternoon: as though the diurnal revolution were somewhat regularly divided between febrile attack and febrile cessation or truce. It is possible, indeed, that a fever of any kind may open its onset at any hour; but this is so contrary to the ordinary rule, that Dr. Fordyce affirms, from his own observation, that ten fevers commence in the day to one at night.

The species before us forms scarcely a case for medicine: since nature, or that instinctive power, which is ever operating to the general welfare of the animal frame, will be usually found competent to its object. So that, if any thing remedially is attempted, it should be confined perhaps to abstinence from animal food, a slight increase of the peristaltic action of the intestines by a dose of neutral salts, and to a removal of the dry heat of the skin by diluents and small doses of ipecacuan, which combines admirably with most aperients, and increases their power, while its own diaphoretic quality continues at least undiminished, and is often improved. This is now well known, though not a discovery of recent date; for Gianella, Vater, and various writers of credit strongly recommended the same from personal experience nearly a century ago.*

Gamesters, after sitting up all night, and being worked up to madness by the chances and reverses of their ruinous stakes, are peculiarly subject to this species. A very cold and wet towel, tied round the temples, seems to give some check to the violent excitement of the brain; but, in the long run, I have generally found persons who have adopted this practice become debilitated and dropsical, and sink into an untimely grave, or creep on miserably through the fag end of a lingering life, that affords no retrospective comfort, with a hospital of diseases about them. But, whether this proceed from the practice adverted to, or from the habitual exhaustion which necessarily accompanies a course of gambling, may admit of a doubt.

GEN. I.
SPEC. I.
Ephemera
mitis.

Medical
treatment.

Gamesters frequently suffer severely from this species.

* Gianella, De admirabili Ipecacoanhæ Virtute in curandis Febribus, &c. Patav. 1754.—Vater, Diss. de Ipecacoanhæ Virtute febrifugâ, &c. Witeb. 1732.

SPECIES II.

EPHEMERA ACUTA.

ACUTE DIARY FEVER.

SEVERE RIGOR; GREAT HEAT; PULSE AT FIRST SMALL AND CONTRACTED, AFTERWARDS FULL AND STRONG; PERSPIRATION COPIOUS; GREAT LANGUOR.

GEN. I.
SPEC. II.

In a few instances the accession is slightly marked, and there is little chilliness or rigor. The heat that succeeds, however, is always considerable; the face is red and bloated; and there are often pungent and throbbing pains in the head, corresponding with the pulsations of the arteries; though at times the pain in the head is dull and heavy. The high-coloured urine deposits a sediment with a tinge of orange-peel.

Generally produced by some affection of the chylopoietic viscera or stomach.

We cannot always trace the remote causes of this species; but it is usually produced by some morbid affection of the stomach, or of the collatitious viscera.

The most obvious and common cause is that of a surfeit, whether of eating or drinking: and there is no great difficulty in interpreting the means, by which this cause operates.

How the present species is thus excited.

The stomach, in the language of Mr. J. Hunter, is the great seat of general sympathy, and associates with almost every other organ in its action. The digestion of even an ordinary meal is a work of some labour to it, and especially in weakly constitutions; a greater degree of heat is regularly expended upon it during this process, and unquestionably also a greater degree of sensorial power; both which are taken from the system at large as from a common stock; and the consequence is, that, in infirm habits, a considerable degree of chill and debility is felt during this process, and other organs become torpid while the stomach is in a state of increased action. Hence infants and old persons sleep during digestion; delicate females feel a coldness shooting over their extremities; and those of irritable fibres become flushed in the face, and show other signs of irregular action. Now, if this be the case in the digestion of ordinary meals, what disturbance may we not expect during the digestion of a meal that overloads the stomach, and with which the stomach is incapable of grappling? what, more especially, when at the same time, by an immoderate use of wine or spirits, the brain becomes exhausted of its energy by the excess of stimulus applied to it? The general chill over the surface, which, in the digestion of an ordinary meal, is only felt by the weak and delicate, is here often felt severely, and sometimes amounts to a horripilation. The first stage of fever is hence produced; and, as the heat and perspiration are most probably a necessary result of the first stage, a foundation is hereby laid for the entire paroxysm. With the reaction that ensues a greater degree of sensorial power returns; the general frame as well as the brain is roused to an increased energy; the diaphragm and its associate muscles, instinctively or remedially,

contract, and the stomach disgorges its contents, or thrusts them forward half-digested into the duodenum.*

The only and well-known mode of cure consists, in the first place, in imitating the above natural process of relief; in unloading the stomach of its mischievous freight by a powerful emetic, and the alvine canal of whatever portion of the heating and crapulous mass has passed into it, by a brisk cathartic. The fever hereby excited will often subside in a diurnal revolution; and no tendency to a return of the paroxysm be produced.

If the species before us, however generated, do not subside within this period of time, or a few hours beyond it, the disease becomes a cauma, or inflammatory fever of the continued kind, and consequently belongs to the genus *ENEZIA*.

There are, however, a few exceptions to this rule; for Forestus gives a case, in which the paroxysm led to a fatal hectic†: and Borelli gives another of equal singularity, in which it kept true to a triennial revolution, returning punctually once every three years.‡

GEN. I.
SPEC. II.
Ephemera
acuta.
Treatment.

Sometimes becomes a cauma,

or assumes some other form.

SPECIES III.

EPHEMERA SUDATORIA.

SWEATING FEVER.

TENSE PAINS IN THE NECK AND EXTREMITIES; PALPITATION;
DYSPNŒA; PULSE RAPID AND IRREGULAR; HEAT INTENSE;
INTOLERABLE THIRST; DROWSINESS OR DELIRIUM; EXCESSIVE
SWEAT.

I HAVE followed M. de Sauvages in introducing sweating-fever, the *Ephemera maligna* of Borsieri §, or Burserius, as he is more commonly called, and the *sudor Anglicus* of most foreign writers, into the present place.

Dr. Caius, who practised at the time of its appearance at Shrewsbury, and has written one of the best accounts of it extant, calls it "a contagious pestilential fever of one day. It prevailed," says he, "with a mighty slaughter, and the description of it is as tremendous as that of the plague of Athens." And we are told by Dr. Willis, "that its malignity was so extreme, that as soon as it entered

GEN. I.
SPEC. III.
Description.

* With respect to the hypothesis, that the heat and nervous influence of the whole system are diminished during digestion, because a part of the general stock is then withdrawn to the stomach, it is scarcely necessary to remark, that it is as improbable as it is destitute of proof. The various circumstances, which, in the preceding paragraph, are fancied to prove, or illustrate it, only show that languor, chilliness, and flushings of the face occasionally take place during the process of digestion, which also sometimes causes a tendency to sleep. These facts, particularly the flushings, constitute so weak a support for the doctrine, that they need no serious refutation. Why should we not here be content with the simple truth, that excesses at table frequently give rise to ephemeral fever?

— ED.

† Lib. i. obs. 7.

‡ Cent. II. obs. 100.

§ Institut. Med. Pract. 8vo. 4 tomes. Ven. 1782-5.

GEN. I.
SPEC. III.
Ephemera
sudatoria.

a city it made a daily attack on five or six hundred persons, of whom scarcely one in a hundred recovered." It was certainly a malignant fever of a most debilitating character, but without any tendency to buboes or carbuncles, as in the plague; though, during some parts of its career, as fatal. It ran its course in a single paroxysm*; the cold fit and hot fit were equally fatal; but, if the patient reached the sweating fit, he commonly escaped.

Mode of
treatment.

Hence, the cure consisted in exciting the sweating stage as quickly as possible, and in supporting the system with cordials throughout the whole of the short, but vehement course of the fever. At Shrewsbury, it continued to rage for seven months, and, during that period of time, a thousand fell victims to its violence. But after the discovery of the benefit of the sweating-plan, it was certainly far less fatal.

General history.

It made its first appearance in London in 1480 or 1483: Caius says, in the latter year, first showing itself in the army of Henry VII. on his landing at Milford-Haven. In London, to which, however, it does not seem to have travelled till a year or two afterward, it took up its abode, with various intermissions of activity, for nearly forty years. It then visited the continent, overran Holland, Germany, Belgium, Flanders, France, Denmark, and Norway; among which countries it continued its ravages from 1525 to 1530: it then returned to England, and was observed for the last time in 1551.

It commenced its attack with a pain in the muscles of the neck, shoulders, legs, or arms, through which a warm aura seemed to creep in many instances; and after these symptoms, broke forth a profuse sweat. The internal organs grew gradually hot, and at length burning, the pungent heat extending to the extremities; an intolerable thirst, sickness, and jactitation followed speedily, occasionally with a diarrhoea, and always with extreme prostration of strength, headach, delirium, or coma, and a wonderful wasting of the whole body. The sweat was tenacious, saburral, and of an offensive smell; the urine thick and pale; the pulse quick, often irregular; and the breathing laborious from the first. The modes of treatment were often puerile, and offer nothing instructive. A good constitution, and exposure to free air, seem to have been most successful in promoting a cure.

Dr. Caius asserts, that a thick noisome fog preceded the distemper, especially in Shropshire, and that a black cloud uniformly took the lead, and moved from place to place; the pestilence in a regular march following its direction. There may be some fancy in this: but it is an unquestionable fact, that the most fatal pestilences of ancient and modern times have been ushered in by stinking fogs or mists, or some other intemperament of the atmosphere, of which the reader will find various instances in the sequel of this work.

The disease is generally, however, supposed to have been produced by inclement harvests and vitiated grain, particularly wheat, which is less hardy than other grains, and sooner infested with albiga (mildew), ustilago (smut), and clavus (ergot or spur). And, in proof that this last was the actual cause, it is observed by Dr. Willan, that the contemporary inhabitants of Scotland and Wales,

* Holinshed, vol. viii. 4to. Lond. 1808.

who fed on oaten or barley, instead of on wheaten bread, were not affected. Nevertheless, whatever was the primary cause, a peculiar miasm or contagion seems to have been generated by the disease itself, which chiefly contributed to its spread and continuance. For we are told concurrently by all the writers, that Englishmen, who withdrew from their own country into France and Flanders with the hope of escaping the attack of the disease, fared no better than their countrymen at home: to which Dr. Freind adds, that, while Englishmen abroad were thus subject to the contagion, foreigners, and even the Scotch in England, were rarely or never seized with it*; a feature that has been copied by Dr. Armstrong in his very forcible description of the complaint, which is perhaps better adapted for poetry than for sober prose.

GEN. I.
SPEC. III.
Ephemera
sudatoria.

Englishmen
only said to
have been sub-
ject to it.

Some, sad at home, and, in the desert, some
Abjured the fatal commerce of mankind;
In vain: where'er they fled, the fates pursued.
Others, with hopes more specious, cross'd the main,
To seek protection in far distant skies;
But none they found. It seemed the general air,
From pole to pole, from Atlas to the East,
Was then at enmity with English blood:
For, but the race of England, all were safe
In foreign climes; nor did this fury taste
The foreign blood which England then contained.†

Something may, perhaps, be set down to the score of a national diathesis; but, without examining very closely into the accuracy of this wonderful part of its history, we may at least indulge a hope, that this peculiar, most virulent and fatal contagion, has long since worn itself out, and become decomposed; though it may be still only latent, and waiting for its proper auxiliaries, once more to show itself in the field.‡

It is said, indeed, by Dr. Coste, the learned editor of Dr. Mead's works in French, that the disease continued to manifest itself occasionally as an epidemic in Picardy; but that, instead of terminating in a single day, it ran on to the third, fifth, and sometimes even to the seventh. It is hence sufficiently obvious, that the two fevers, though possessing many points of resemblance, are not precisely the same. Yet M. Bellot, in his thesis "*An febri putridæ Picardii SUETE dictæ, sudorifera?*" has maintained Dr. Coste's opinion.

* Hist. of Physic, vol. ii. p. 533.

† Art of Preserving Health, b. III.

‡ Navier, *Maladies Populaires*, &c.

GENUS II.

ANETUS.

INTERMITTENT FEVER. AGUE.

PAROXYSM INTERMITTING, AND RETURNING DURING THE COURSE OF THE DISEASE; THE INTERMISSIONS GENERALLY PERFECT AND REGULAR.

GEN. II.

UNDER the preceding genus, the remote cause, whatever it consists in, lays a foundation for not more than one paroxysm. In the genus before us, the cause introduces a tendency to a recurrence of the paroxysm from the first; and, in most cases, with an interval that continues true to itself as long as the disease lasts. I say in most cases, because we shall see presently that, when intermittent fever has raged very extensively, it has not unfrequently established a type of one kind in one person, and of another kind in another; whilst, in the same patient, quotidians have changed to tertians, tertians to quartans, quartans to quotidians, and all of them in a few instances to continued fever, in the most capricious and anomalous manner.*

Type sometimes varies.

United with remittents by Cullen.

Dr. Cullen unitēs intermittents and remittents into one section of fevers, merely distinguishing them as intermittents with an interposed apyrexia, and intermittents with remission alone; and, as already observed, he makes it a part of the pathognomonic character of both that they are derived from marsh miasm—*miasmate paludum ortæ*—as though there were no other cause of their production, whence Dr. Young gives to intermittents and remittents the common name of *paludal* fever.

How far this union is well founded.

The only ground, then, assumed for this union of intermittents and remittents, is the supposition, that the cause which generates them is single, common to the two, and never generates any other fever. Now, although the febrile miasm, issuing from marsh lands, is by far the most common cause of intermittents, it is by no means the only cause; for we find intermittents, like all other species of fever, produced from various sources; existing in hot countries as well as in cold, in high lands as well as in low lands, sporadically as well as epidemically; sometimes excited by sympathy, sometimes by contagion. Even in tertians, Dr. Cullen is obliged to admit of instances in which other agents are necessary; but then, says he, they are only *co-agents*, and would

* “In hot climates, and even here, many intermittent fevers become remittent, and from being remittent, they will become continued, unless vigorous measures are adopted, and they may rapidly prove fatal by congestion of the head, thorax, or abdomen. Now and then this may be the case here, from some peculiarity in an epidemic. We have no idea in this country of what aguish fevers, intermittent or remittent, are in hot climates. In Italy these are called pernicious fevers; for, as soon as a person is seized, he may fall into a comatose state, from which he never recovers; and, on inspection after death, the greatest degree of congestion is found in the lungs and head, and also in the abdominal viscera.” Professor Elliotson’s Lectures at Lond. Univ., Med. Gaz. 1831-2, p. 926.

not operate alone. "*Has potestates excitantes pro parte principii hic admittimus, licet neutiquam excitassent, si miasma paludum non antea applicatum fuisset.*" But this is the very point of controversy; for, in many instances, they produce the disease where marsh miasm cannot be suspected. I have seen an isolated case of a regular tertian on the highest part of Islington; and another on the dry and gravelly coast of Gosport, a situation so healthy that all the inhabitants escaped, when in the year 1765 a most fatal and epidemic fever, originating unquestionably from the miasm of swampy grounds, pervaded the whole island of Portsea, situate at not more than a mile distant on the other side of the water, and exhibiting, in different individuals, and often in the same person, all the diversities of the intermittent, remittent, and continued type. Dr. Fordyce affirms, that he has seen an intermittent communicated by infection, meaning the miasm from human effluvium*; and where the yellow fever has long existed, or become widely diffusive, this is common. Where it arises from sympathy, or organic affection, the case is still clearer. "Two children," says Mr. J. Hunter, "had an ague from worms, which was not in the least relieved by the bark; but by destroying the worms they were cured. We have in like manner agues from

GEN. II.
Anetus.

Intermittents
from other
sources than
marsh miasm.

* Dr. Cleghorn, in his work upon the diseases of Minorca, expresses a similar belief. "Dr. Wells, a colleague of Dr. Fordyce at St. Thomas's Hospital, accounts for Dr. Fordyce's opinions by remarking, that he (Dr. F.) fancied that continued and intermittent fevers were mere varieties of the same disease; and, as it appeared in those days, that continued fever was contagious, so he was obliged to maintain that ague was contagious. Dr. Cleghorn's mistake is supposed to have arisen from his having observed, that most of those who were about the sick in Minorca had the disease, forgetting that it did not arise in consequence of emanations from the sick, but from the situation in which they were placed." (Elliotson's Lectures at the Lond. Univ., Med. Gaz. 1831-2, p. 921.) This want of discrimination is evident in much of the argument brought forward by writers in proof of the extension of certain diseases by contagion. In opposition to Dr. Fordyce's hypothesis, let us hear what conclusion Dr. Brachet, physician to the Hôtel Dieu of Lyons, has adopted, as the result of his investigations:—"I have seen," he remarks, "tanyards situated in the midst of intermittent infection; and to my enquiries the reply has been, that the disease leaves these places untouched. I attended for a long while the anatomical theatres and hospitals, yet never found my fellow students suffer from intermittent fevers. I have seen the horrors of war bring typhus amongst us, but not intermittent fever. I have consulted authors: every where have I seen typhus arise from the infection of animal miasmata, and never are intermittent fevers the consequence of the crowding of human beings or patients together, or from the action of the putrid emanations of animal substances." He then notices that butchers, leather dressers, fellmongers, and others, whose business exposes them continually to the effluvia of putrid animal substances, do not suffer from intermittent fever. Dr. Brachet then shows how you may at option render the most healthy village the seat of intermittent fever, by forming pools about it, in very hot weather, for the watering of hemp, and then removing them. This he regards as a convincing proof, that intermittent fevers are the product only of emanations from putrefying vegetable substances. He observes, likewise, that intermittent fevers never prevail to any extent in winter, but at the commencement of the warm weather of the spring, or in the autumn. The reason of this is, that the cold of winter prevents vegetable matter from putrifying, while the warmth of spring promotes the decomposition of it. The active vegetation which then follows, furnishes no detritus till the end of summer, when intermittents begin again; a little earlier or later, in different years, according as vegetation may be more or less advanced, and the period when its detritus is blended with stagnant waters. See Archives Gén. de Méd., tom. ix. p. 380. — En.

GEN. II.
Anetus.

Sometimes
found in high-
lands, while
lowlands
escape.

Illustrated in
modern Greece.

Northfleet.

many diseases of particular parts, more especially of the liver and the spleen, and from an induration of the mesenteric glands.*

But one of the most singular and convincing proofs, that the decomposition of marsh lands is not essential to the production of intermittent fever, is to be found in the epidemic intermittent of 1780, as described by Sir George Baker, and which we shall have occasion to advert to more particularly hereafter; for, during this, the intermittent harassed very extensively the elevated parts of Lincolnshire, while the inhabitants of the neighbouring fens were free from its ravages.† And, in like manner, the dry and healthy climate of Minorca is sometimes attacked with remittent or intermittent fever, while Sardinia, proverbial for its insalubrity and febrile epidemics, escapes.‡ “In the year 1812,” says Dr. Mac-michael, “I was detained several months at Trichiri, a small seaport in the mouth of the gulf of Volo in Thessaly. The town is built on a dry limestone rock, but it is notorious for *malaria*. During my stay here, I made an excursion to visit the celebrated pass of Thermopylæ, and slept one night near the marshy district in that neighbourhood. On my return, the friends whom I had been waiting for arrived from Athens, and we all embarked on board a Greek vessel, to cruise in the Archipelago. On the following day I was seized with a most severe fit of the ague, and, at the same time, a servant belonging to the party suffered a similar attack. It might be said that I had caught my intermittent at Thermopylæ, but the servant had not quitted the dry rock of Trichiri, upon which he had remained more than a week.”§ In like manner, Sir Gilbert Blane informs us, that while the village of Green Hithe, nearly on a level with the marsh of Northfleet, is unaffected with intermittent fevers, the adjacent hills suffer considerably from them: and he refers to other anomalies of the same kind.||

* On Blood, part II. ch. iv. p. 411. Here, perhaps, it would be more correct to say, occasionally, but without any regularity, from local irritation. Thus, when matter forms in deep-seated parts, there is frequently one or more rigors, followed by heat, &c.; and when patients have strictures, for which they are using bougies, the same kind of constitutional disturbance is not uncommon; but it has not the regular type of intermittent fever; and, even if it had, the case would throw no light on the question, whether common ague can be excited by effluvia from animal substances? Dr. Elliotson admits, in his Lectures, that sporadic cases, even of ague, which cannot easily be traced to malaria, are frequently met with; but he has no doubt, that, if we could ascertain all the circumstances, we should find, that the individual had a striking tendency to it, and had been exposed to malaria by passing through a market, or some other place, in which there was vegetable matter in a state of decay. The same excellent physician also reminds us, that, though the influence of malaria is so great, yet, cold and wet, and other causes of debility, will induce ague without the reapplication of malaria, when a person has once had it. Sometimes, too, when malaria has been applied, the disease does not occur till such circumstances as these have taken place. These observations are of great value in accounting for circumstances in the history of ague, which would otherwise lead to most erroneous views.—Ed.

† Med. Trans., vol. iii. art. xiii.

‡ Cleghorn, Disease of Minorca.

§ New View of the Infection of Scarlet Fever, &c. 8vo. 1822.

|| Select Dissertations, &c. p. 111. Such anomalies may perhaps be explained on principles which leave the Cullenian doctrine as firm as ever. “A certain degree of moisture,” as Professor Elliotson observes, “is necessary for the production of ague by the fermentation and putrefaction of vegetable matter, which

To unite remittents, therefore, with intermittents, from an idea of their having a single and common origin, is to depart from the clear line of symptoms into a doubtful region of etiology. If intermittent ought to be separated (as unquestionably they ought) from continued fevers, so ought remittent to be separated from intermittent. To say that intermittents often run into remittents is to say nothing, for remittents as often run into continued fevers; and it is now an established doctrine, that there is no continued fever whatever without occasional remissions. In effect, all fevers have a tendency to run into each other, and many causes are perhaps common to the whole. The difficulty is in drawing the line; yet a like difficulty is perpetually occurring to the physiologist in every part of nature; and equally calls for discrimination in zoology, botany, and mineralogy; and Dr. Parr has correctly observed, that "if a *specific* distinction can be established in any branch of natural history, it must be in the separation of remittents from intermittents." Vogel unites remittent with continued fevers, to which Cullen, rightly enough, objects; but the former has as much reason on his side, as the latter has for uniting them with intermittent. Sauvages, Linnæus, Sagar, and most modern writers, correctly distinguish each from the other. It must nevertheless be admitted, that marsh miasm is by far the most frequent cause of intermittents; and hence the frequency and severity with which they visited our own country in the sixteenth and seventeenth centuries, before the lowlands were artificially drained of their moisture, and, consequently, the atmosphere of its taint; during the former part of which, Dr. Caius tells us,

GEN. II.

Anetus.

Hence no sufficient ground for Cullen's arrangement.

gives rise to the exhalations. Hence, in a moderate swamp, you see why dry weather may put a stop to the disease, namely, by putting a stop to putrefaction; and you also see why, in extremely wet situations, there is often no ague, because too much fluid impedes putrefaction; but this wet, by dry weather, may be reduced to just sufficient swampiness for vegetable decomposition to take place, and malaria to be produced. Just as dryness would prevent decomposition, so extreme wetness and moisture will likewise stop it. If the matter, which is to be decomposed, be diffused in a very large quantity of water, the putrefaction of course ceases, or is not evident; so that some places which were very wet and healthy, have been made unhealthy by being dried just sufficiently for putrefaction to go on vigorously; and again, other parts, which were dry, and which never gave out any exhalations, have been caused to do so by a certain degree of moisture falling upon them. Thus, you see, that according to situation, the same additional moisture may produce an ill or a salutary effect. High grounds may, therefore, suffer from the same cause, which removes all unhealthiness from low grounds. A certain degree of rain, falling upon high ground, will not all remain there, but will roll down; still, it has moistened the parts sufficiently for decomposition to take place above; whereas, when it comes on the low grounds, and there collects, it may be so abundant as to dilute all the vegetable matter, and prevent it from putrifying, and so put a stop to the unhealthiness of the part." (Lect. at Lond. Univ., Med. Gaz. 1831-2, p. 845.) Considerations of this kind throw light on various circumstances, which would otherwise be completely perplexing, or lead to erroneous inferences. Even supposing no rain at all had fallen on high lands, where ague prevailed, while none existed in lower situations, we are to remember, that the nocturnal dews in many places are nearly equivalent to rain. The fact that malaria is more likely to produce ague, when a person has been exposed to it at night, or in a state of health impaired by fatigue, privations, and other causes, is generally acknowledged. Strangers, also, who visit situations where malaria is present, are more frequently attacked with intermittent or remittent fevers than the natives themselves. — Ed.

GEN. II.
Anetus.

Intermittents
generally true
to their type
in the same
person,

but occasion-
ally vary in
different in-
dividuals.

that the mortality from agues in London was such, that the living could hardly bury the dead; and Bishop Burnet, that at one time, 1558, they raged like the plague.

When an intermitting fever or ague is, by the operation of marsh miasm, or any other cause, once introduced into the system, and has once discovered its type, or given an interval of a particular measure between the close of the first and the commencement of the second paroxysm, it continues true, as a general rule, not merely to the same measure or extent of interval, but to the length and severity of paroxysm, through the whole course of the disease; the character of the cold stage determining that of the hot, and both together that of the sweating stage; and the paroxysm ceasing because it has completed its career. But the first interval, like the first paroxysm, which regulates the rest, is of different duration in different cases: of the reason of this difference we know nothing; sometimes it seems to depend upon the season or the temperament of the atmosphere, operating upon the febrile miasm that is diffused through it, and all who have agues in the same place, or at the same time, have them of the same kind.* Sometimes, on the contrary, it seems chiefly to depend upon the time of life, the idiosyncrasy, or the particular condition of the constitution, for, as already observed, different individuals, even in the same place and under the same roof, exhibit different types. But, upon this subject, we have no clear information. It seems expedient, however, to observe, that the fact itself of such regularity of recurrence and interval is an insurmountable objection to the doctrine of M. Broussais, that all fevers consist in an inflammation of the mucous membrane of the stomach or intestines, as in truth it is to every hypothesis that contemplates fever as a local inflammation of any organ. And hence the doctrine of types is an intractable stumbling-block to all such writers; who, from the difficulty of encountering them, are too apt to ejaculate with M. Monfalcon, "*peu importe le type d'une pyrexie*†;" and then dexterously to reach forward to some point of much easier solution.‡

Nevertheless, whatever be the cause of these discrepancies, it lays a good foundation for dividing the intermittent genus into distinct species, and the five following are sufficient to comprise all its principal diversities:—

| | |
|------------------------|-------------------|
| 1. ANETUS QUOTIDIANUS. | QUOTIDIAN AGUE. |
| 2. ——— TERTIANUS. | TERTIAN AGUE. |
| 3. ——— QUARTANUS. | QUARTAN AGUE. |
| 4. ——— ERRATICUS. | IRREGULAR AGUE. |
| 5. ——— COMPLICATUS. | COMPLICATED AGUE. |

* Agues, occurring in the spring, are generally tertians and quotidians, and readily give way to proper remedies; whilst those prevailing in the autumn are more intractable; and quartan intermittents (the most intractable of all) constitute then a more considerable proportion of the cases. Dr. Joseph Brown, in *Cyclop. of Pract. Med.*, art. FEVER.

"Febris autumnalis
Est longa aut lethalis."

† *Histoire des Marais et des Maladies causées par les Emanations des Eaux Stagnantes.* 8vo. Paris, 1824.

‡ From "It seems," &c. an addition from the author's MS.

As the connection between all these is peculiarly close, and they occasionally run into each other's province; and, more particularly, as the same mode of treatment is common to the whole, it will be most convenient to defer the general history and praxis, till we have taken a survey of these species in their respective definitions, and the varieties they often exhibit.

It may, however, considerably assist the student, and simplify his pursuit in acquiring a knowledge of their characters, to attend to the three following remarks:—

Firstly, the shorter the intermission, the longer the paroxysm.

Secondly, the longer the paroxysm, the earlier it commences in the day.

Thirdly, the more durable the cold fit, the less durable the other stages.

Thus, the quotidian has a longer paroxysm and a shorter interval than the tertian; and the tertian a longer paroxysm and a shorter interval than the quartan. And thus again, while the quotidian has the longest duration, it has the slightest cold stage; and while the quartan has the shortest duration, it has the longest cold stage. It is also the most obstinate to cure.

Each of these species, however, admits of considerable variations: for sometimes we find the paroxysm protracted beyond its proper period; sometimes anticipating, and sometimes delaying its proper period of return. In other cases, we find each of these species catenated with, or giving rise to, foreign symptoms or other diseases. And we also meet with a peculiar variety of the quotidian ague, in its being sometimes limited to a particular part or organ, in which case it is usually accompanied with very distressing pain.

The most irregular of all the species is the fourth, for this is sometimes found to deviate from all the three rules I have just laid down; but particularly in the greater length of its interval, which is sometimes double or even treble that of the quartan, whose interval of seventy-two hours is the longest of the three more disciplined species; it is hence found under the various forms of a five-day, a six-day, a seven, eight, nine, and even a ten-day ague; and sometimes is so extremely vague as to bear no proportion whatever between the violence of its paroxysm, the duration of its stages, and the period of its return.

The fifth species is distinguished from the rest by its peculiar complexity, consisting of double tertians, triple tertians, unequal tertians, duplicate tertians, together with as many varieties of the quartan type; the nature and key of which will be more particularly noticed under the species itself.

GEN. II.
Anetus.

Axioms in intermittent fevers.

Illustrated.

All the species subject to varieties:

particularly the fourth.

SPECIES I.

ANETUS QUOTIDIANUS.

QUOTIDIAN AGUE.

INTERMISSION ABOUT EVERY TWENTY-FOUR HOURS; PAROXYSM COMMENCING IN THE MORNING; USUAL DURATION UNDER EIGHTEEN HOURS.

GEN. II.

SPEC. I.

Resembles the double tertian.

How distinguished from it.

THE genuine quotidian is of less frequent occurrence than the other species; but it has a considerable resemblance to that variety of the complicated intermittent, which has generally been denominated a double tertian, and with which it is often confounded. It is distinguishable, however, to an attentive eye by the regularity of its paroxysms, which are true to themselves on every return; while, in the double tertian, the alternate paroxysms only are true to each other, as we shall have occasion to observe more particularly in the proper place. The quotidian, like the tertian and quartan, has sometimes been epidemic.

The quotidian intermittent is occasionally limited in its attack to a particular part, and is occasionally connected with other affections. It deviates also now and then from its common rule, in having an imperfect intermission, and in precipitating or procrastinating every subsequent paroxysm; and hence affords us the following varieties:—

| | |
|----------------------|-------------------------|
| α Partialis. | Partial quotidian. |
| β Comitatus. | Catenating quotidian. |
| γ Protractus. | Protracted quotidian. |
| δ Anticipans. | Anticipating quotidian. |
| ϵ Cunctans. | Retarding quotidian. |

α A. quotidianus partialis.

In the PARTIAL QUOTIDIAN, the febrile attack is confined to a particular part or organ, and usually accompanied with distressing pain.

Under this modification, sometimes one side of the body has suffered, while the other has escaped; sometimes one or both eyes; but more generally the whole or half the head, not unfrequently resembling cases of cephalæa, and particularly that species of it which is called hemicrania.

β A. quotidianus comitatus.

In the CATENATING QUOTIDIAN, the disease associates with, or gives rise to, various foreign symptoms or other diseases; and hence is often found in union with rheumatic affections, particularly lumbago and sciatica. Sauvages quotes a case, in which it associated with daily attacks of a frightful epilepsy.* And Dr. A. Munro narrates a similar instance, though less severe, and alludes to several others.† Torti has made a collection of numerous examples of this variety, and has united them into one family,

* Class II. Febr. Intermit. Quot. Spec. iv.

† Edin. Med. Essays, vol. ii. art. xix.

under the name of *febres intermittentes comitatæ*. Galen has described one or two of them under the name of *epiala*.

In the PROTRACTED QUOTIDIAN, the intermission is inordinately short, or imperfect. In the former case, the paroxysm is lengthened beyond the usual period of eighteen hours; and, in the latter case, it does not so completely subside, as to leave the intermission totally clear of febrile symptoms. On which last account, the Latins described this variety under the name of *quotidiana continua*; and the Greeks under that of *amphemerina*.

In the ANTICIPATING QUOTIDIAN, which is the name given to our FOURTH VARIETY from Dr. Fordyce, the paroxysm precedes its antecedent period usually by about two hours, and continues the same fore-march at every recurrence; so that the accession may hereby be thrown into any hour of the day or night. This form is denominated a *febris subintrans* by Professor Frank and various other writers.*

The RETARDING QUOTIDIAN, which, like the last, has been particularly noticed and named by Dr. Fordyce, forms a direct counterpart to the anticipating; the paroxysm delaying its antecedent period usually by about two hours, and continuing the same delay at every recurrence; so that here also the accession may be thrown into any hour of the day or night.

There are few diseases, moreover, in which the quotidian is not occasionally to be found as a symptom; but it occurs especially in hysteria, catarrh, gout, peripneumony, ischury, quinsy, and several species of odontia.

GEN. II.

SPEC. I.

Anetus
quotidianus.γ A. quotidi-
anus protractus.δ A. quotidi-
anus antici-
pans.ε A. quotidi-
anus cunctans.

SPECIES II.

ANETUS TERTIANUS.

TERTIAN AGUE.

INTERMISSION ABOUT FORTY-EIGHT HOURS: PAROXYSM COMMENCING AT NOON; USUAL DURATION UNDER TWELVE HOURS.

THE tertian ague, the *tritæus* of the Greeks, occurs most frequently in the spring and summer months; though there is a spurious kind that shows itself in the autumn. The chill, during the cold fit, is intense, with convulsive shivering, rigidity, and gnashing of the teeth. It is, however, of shorter duration than that of the quartan, and sometimes passes off in less than half an hour; and is succeeded first by nausea or vomiting, and afterwards by a pungent penetrating heat, frequent respiration, urgent desire for cold drink, wakefulness and headach, sometimes delirium. At length, a moisture on the skin, gradually advancing to a copious sweat, breaks forth, the urine commonly deposits a lateritious sediment, and there is often some looseness of the bowels. The entire paroxysm

GEN. II.

SPEC. II.

Description.

* J. P. Frank, De Curandis Hominum Morbis Epitome, tom. i. p. 41. Mannhemii, 1792.

GEN. II.
SPEC. II.
Anetus
tertianus.
Most common
in the hale
and robust.
Duration as
calculated by
Hippocrates.

sometimes ceases in six hours, but more generally extends to eight or ten; if it exceed twelve, as it does occasionally in the autumn, the disease forms the spurious tertian I just have alluded to. As the quotidian is mostly common to infants and persons of delicate habits, the tertian chiefly affects those of riper years or of firmer fibres, and especially persons of a bilious temperament. It was the opinion of Hippocrates, that the tertian ague, if left to nature, would run itself out in seven paroxysms; and Vogel adds, that, when this is the case, there is usually the appearance of a dry scabby eruption about the lips on the fourth or fifth paroxysm. But the period, pointed out by the former, does not hold in our own day; and the disease has often continued obstinate in spite of cutaneous eruptions, not only about the lips but over the body. Sydenham asserts, that, in the autumn, in which, however, a genuine tertian is rarely to be met with, its ordinary natural course is double the term allotted by Hippocrates, or rather that the term of its paroxysms amounts to the space of fourteen days. The tertian exhibits occasionally the two following varieties:—

| | |
|---------------------|---------------------|
| α Comitatus. | Catenating tertian. |
| β Protractus. | Protracted tertian. |

Explanation
under the pre-
ceding species
will apply to
these varieties.

to both which the explanation already given under the same terms in the preceding species will equally apply. As an associate disease, it is chiefly to be found united with syncopal and soporose affections, indicating some oppression of the brain; or with cholera or dysentery, mostly indicating irritation or congestion in the liver.

SPECIES III.

ANETUS QUARTANUS.

QUARTAN AGUE.

INTERMISSION ABOUT SEVENTY-TWO HOURS; PAROXYSM COMMENCING IN THE AFTERNOON; USUAL DURATION UNDER NINE HOURS.

GEN. II.
SPEC. III.
General
character,

THIS, which is also the quartana of Celsus, is the tetartæus of the Greek writers. It is rarely found in the vernal season, but is common in the autumnal, in which quarter, also, it is far the most obstinate of all the species, and especially if, as Celsus observes, it show itself only a short time before the commencement of winter. Its chief subjects and sufferers are those of advanced years, and of a melancholic habit; for children and young persons, who principally feel the effects of the two former species, are but little obnoxious to it. It commences usually about, or a little before, five o'clock in the afternoon. The cold fit is less vehement than in the tertian, but of longer duration, and will sometimes continue for two hours, but usually without sickness or diarrhoea. It yields to a heat that is rather troublesome from its dryness than from its intensity, and which is rarely succeeded by a sensible perspiration.

There is a heaviness or dulness in the head, rather than acute pain : and often, during the intermediate days, a sense of soreness over the body, as though it had been generally bruised, which strikes through to the bones. It is here also we principally meet with parabysmic tumours, and especially of the spleen and liver : in the former of which organs they are vulgarly called *ague-cakes*.

The quartan offers the following varieties :—

GEN. II.
SPEC. III.
Anetus
quartanus.
and effects.

| | |
|---------------|-----------------------|
| α Comitatus. | Catenating quartan. |
| β Protractus. | Protracted quartan. |
| γ Anticipans. | Anticipating quartan. |
| δ Cunctans. | Retarding quartan. |

Of all which an explanation will be found, by turning to the same varieties under the first species.

From the tendency which this species has to affect the abdominal viscera, it is often met with as a symptom in diseases of the spleen, liver, and various adjoining organs. And hence it occasionally interchanges with dysentery, and particularly when the latter is a prevailing or epidemic disease. This remark will also apply to the preceding species, and, under the one or the other form, was often found exemplified in the fatal dysentery that ravaged a large part of Ireland in the year 1818*, and which still more frequently occurs in tropical climates.†

Often accom-
panies or alter-
nates with
other diseases.

SPECIES IV.

ANETUS ERRATICUS.

IRREGULAR AGUE.

INTERMISSION AND PAROXYSM POSSESSING LITTLE REGULARITY:
THE FORMER MORE THAN SEVENTY-TWO HOURS.

WE have already perceived that there is occasionally some degree of irregularity in all the preceding species, least of all, however, in the quartan. And hence all the above might, in such instances, be named erratic. But the peculiar character of the present species is, that the duration of the intermission exceeds that of all of them ; on which account it can never be confounded with any of the rest.

GEN. II.
SPEC. IV.

Distinctive
character.

The chief varieties are the following, which, however, might be considerably enlarged, but it is unnecessary. They are principally taken from Sauvages and Vogel ; and, for other authorities, the reader may turn to the volume of Nosology :—

| | |
|--------------|-----------------|
| α Quintanus. | Five-day ague. |
| β Sextanus. | Six-day ague. |
| γ Septanus. | Seven-day ague. |
| δ Octanus. | Eight-day ague. |

* Cheyne, in Dublin Hospital Reports, vol. iii.

† Climate and Diseases of Tropical Countries, &c. by C. Chisholm, M.D.
p. 52. Lond. 1822.

GEN. II.
SPEC. IV.
Anetus erraticus.

Sometimes
peculiarly
obstinate.

ε Nonanus.
ζ Decimanus.
η Vagus.

Nine-day ague.
Ten-day ague.
Vague and irreducible.

Several of the above have occasionally persevered with great obstinacy; in some instances, for upwards of two years without ceasing. The last variety is equally irregular as to the violence of its paroxysm, the duration of its stages, and the period of its return. Several of Sauvages's species of hemicrania may be properly referred to this place, and especially those which by some writers have been denominated INTERMITTENT LARVATÆ, or disguised intermittents.

SPECIES V.

ANETUS COMPLICATUS.

COMPLICATED AGUE.

PAROXYSMS INTRICATE, MULTIPLICATE, OR BOTH.

GEN. II.
SPEC. V.
Analysis of its
intricacy.

THERE are numerous examples of ague which, to an inattentive eye, are as irreducible to any regular order as those which belong to the last variety of the preceding species, but which, when minutely examined, are found, however intricate, to be composed of types, not that uniformly resemble each other, but that recur in alternate sets, every set being true to itself, while it differs from that with which it alternates in the duration of its intervals, or of its paroxysms, or of the time of its accession. And hence, although in some shape or other, most of them return perhaps every day, and are often mistaken for irregular quotidians, they are, in fact, double or triple tertians, or quartans, discovering their real nature by these alternating distinctions.

The following are the chief varieties:—

α Tertianus duplex.
Double tertian.

The paroxysms of the one tertian occurring in the intermissions of the other: and the two sets evincing a difference of duration or of violence.

β Tertianus triplex.
Triple tertian.

A double tertian, taking place as above; but one of the sets having regularly two paroxysms on the day of its return, and the other, one alone.

γ Tertianus impar.
Double unequal tertian.

The one set evincing a more perfect, the other a less perfect, intermission.

δ Tertianus duplicatus.
Duplicate tertian.

A single tertian with two paroxysms on the regular day of attack, the intervals being of ordinary duration.

ε Quartanus duplex.
Double quartan.

The paroxysms of the one set occurring in the intermissions of the other, and evincing a difference of duration or of violence: with an interval on the third day alone.

GEN. II.
SPEC. V.
Anetus
complicatus.

ζ Quartanus triplex.
Triple quartan.

Consisting of a single quartan with regularly-returning paroxysms; while each of the intervening days is marked with a slighter or separate attack.

η Quartanus duplicatus.
Duplicate quartan.

Consisting of a single quartan with two paroxysms on the regular day of attack: the intervals being of ordinary duration.

Quartanus triplicatus.
Triplicate quartan.

Consisting of a single quartan with three paroxysms on the regular day of attack; the intervals being undisturbed, and of ordinary duration.

Having thus distinctly noticed the several species and chief varieties of intermittent fever, I shall proceed to offer a few remarks upon its general history and medical treatment.

Whenever the accession of an intermittent is violent, be its type what it may, it is sometimes attended with very alarming symptoms, as syncope, apoplexy, vehement spasms over the whole system, or a coldness or torpor which threatens death.* Yet, when not violent, nor of very long duration, especially when of the tertian type, it is often serviceable to the general health, and carries off many disorders of other kinds. Dr. Fordyce affirms that he has seen it of considerable use in curing or alleviating chronic rheumatism, habitual indigestion, cutaneous eruptions, protracted inflammations, epilepsies, and hysteria.† And his assertion is corroborated by other authorities.‡ It is to this kind of remedial fever, that Professor Frank gives the name of *depuratory*.§

General history
of intermittent
fevers.

Depuratory
fever of Frank.

The duration of intermittents is of great uncertainty. The vernal agues generally disappear with the advance of summer; the autumnal are more obstinate, and especially the quartan.|| Where they have remained long, and have become habitual, even their removal must be attempted with great caution; for, when abruptly suppressed, they have been known to lay a foundation for

Duration
uncertain.

* It once occurred to Dr. Joseph Brown to see a person die in what appeared to be the cold stage of a first fit of ague. Heat applied in various modes, ammonia, ardent spirits, ether, and other stimulants, failed to bring on reaction. The patient lay as cold as marble, and shivering violently, without any pulse at the wrist, and his heart acting very feebly, for eighteen hours, at the end of which he expired, his intellect having been unclouded till within a few minutes of his dissolution. The principal morbid appearance discovered was in the liver, which was very much enlarged, had a lobulated appearance, and was gorged with blood. Cyclop. of Pract. Med., art. FEVER. — Ed.

† On Fever, Diss. II. p. 16.

‡ Salmuth, cent. II. obs. 14. — Ephem. Nat. Cur., dec. III. ann. III. obs. 30.

§ J. P. Frank, de Curandis Hom. Morb. Ep., tom. I. p. 48. || Ib., p. 44.

GEN. II.

Anetus.

Has continued
through a great
part of life :

and formed
ague-cakes
and other con-
gestions.

Has been found
congenital.

Has destroyed
in a single
paroxysm.

The paroxysm
has been com-
pleted in a
minute.

Quotidians
more variable
than any other
type.

Intermittents
peculiarly fre-
quent in
London, from
1781 to 1785.

Sir George
Baker's account
of 1781-2,

a host of other maladies, often of a more fatal description, as paralysis, various visceral affections, and even sphacelus.

Ludolf gives an instance of an eight-day ague (*anetus erraticus octanvus*) continuing for eighteen years; yet this was probably a double quartan; while we have abundant examples of a continuance of the regular quartan for nine*, twelve†, eighteen‡, twenty§, twenty-four||, and thirty years¶, and one instance of its lasting for not less than forty-eight years.** It is in this species, therefore, that we chiefly meet with those congestions in the spleen which are called ague-cakes, as also with scirrhusities in the liver, pancreas, and other abdominal organs, which by Bonet, Swalwe, Senac, and other writers, have been regarded as causes of the disease, but by Van Hoven, and most pathologists of the present day, excepting, perhaps, Cruveilhier, are more correctly resolved into effects.

Schenck gives a case of congenital quartan, or in which it appeared in an infant immediately after birth††; and Paullini another, in which, though not strictly congenital, it appeared in very early infancy.‡‡ But such examples are rare. Among other singularities, I may observe, that the accession has sometimes been so violent as to destroy the patient in the course of the first paroxysm, of which an instance will be found in Senac§§, while, at other times, it has been so slight and rapid, that the entire paroxysm has run through its course in a minute.||||

The character of the intermittent seems in a considerable degree to depend upon the age, or idiosyncrasy, of the individual, and the temperament of the atmosphere. We find, also, that variations more usually take place in the quotidian, than in any other type, which we should, perhaps, ascribe to its occurring more frequently in early life, when the frame is more irritable; and to the debility, which the constitution suffers from this type above that of any other, in consequence of the greater length of its paroxysms, and the greater brevity of its intervals, by which means, the prostrated strength of the system has no time to rally.

In this metropolis, from causes which have not been handed down to us, and which, indeed, do not appear to have been traced at the time, intermittent fevers were more than ordinarily frequent from the year 1781 to 1785: and the remarks I have just made apply in an especial manner to all these. As a single example, let us select those of 1782, as described by Sir George Baker and Dr. Reynolds, in an article drawn up by the former with an admirable combination of learning and liberality, sound critical judgment, and inquisitive research.

"The type of the fever of 1781-2," says Sir George, "was either tertian or quotidian; the former being more common in the first

* Eph. Nat. Cur., dec. II. ann. VIII. obs. 45.

† Avicenna, canonum I. lib. IV. tr. II. cap. VI.

‡ Madai, Von Weekselfiebern, sect. 144.

§ Eph. Nat. Cur., dec. III. ann. IX. and X. obs. 51.

|| Marcellus Donatus, lib. III. cap. XIV. p. 291. — Pontanus, De Febr. Conel., lib. VIII.

¶ Binninger, obs. cent. V. N. 64. Wierius, obs. p. 37.

** Gabelchover, cent. VI. obs. 74.

†† Obs. lib. VI. N. 36.

‡‡ Cent. I. obs. 94.

§§ Von Weekselfiebern, b. II. cap. VI.

|||| Reil, Memorab. Clin., vol. II. Fasc.

part of the winter; the latter, from the middle of February to the end of June. With respect to the former, NOTHING OCCURRED to my observation which is worthy of notice.* On the latter, Dr. Reynolds communicated to him the following information:—

The quotidian fevers were irregular in their invasion, and uncommon in their appearance; and no cases resembled each other, except in very few circumstances. The first attack generally commenced with a horror; but the subsequent paroxysms, though often beginning with a sense of cold, were chiefly without horror. The intermission was short and seldom perfect. The symptoms were very severe, and in many cases dangerous, and leaned strikingly to a typhous form. Great and sudden oppression of the head, anxiety, depression of spirits, a dry, parched tongue, yet less covered with hardened mucus than might be expected; a pulse low, quick, and intermitting; bowels, variable; urine dark-red and clear, without any sediment, constituted the ordinary signs. Many had a low muttering delirium; two or three, a laborious respiration; a few, spasms and twitchings of the tendons: aphthæ appeared occasionally; and one patient exhibited symptoms of violently acute rheumatism. The bark was universally successful; and, “I was as much pleased,” says Dr. Reynolds, “with its present efficacy, as I was in the year 1781 mortified by its extraordinary want of power. Half the quantity of it which I used on that occasion was sufficient on this.”

In other words, idiosyncrasy and atmospheric temperament were both peculiarly visible, and gave a peculiar character, in the one instance, to particular cases, and, in the other, to the general disease. In plethoric habits, the head was greatly oppressed, with a tendency to delirium. In those of a nervous or irritable disposition, the intermittent was connected with spasms and twitchings of the tendons. And those, disposed to rheumatism, had acute arthritic pains. The state of the atmosphere, and general character of the season, Dr. Reynolds has forgotten to notice: but we see evidently, and indeed he himself allows, that they give a typhous impression to the epidemic; which, from the same, or from other causes, is also peculiarly distinguished by the easy victory it yielded to the use of the bark, as that of the preceding year was distinguished by its obstinate resistance to this medicine.

If we ascend a year higher, or to 1780–1, we shall meet with an equal diversity of symptoms. “These fevers,” (intermittents), says Sir George Baker, “were in general no other than the common ague: but in the more inland counties of England, they were often attended with peculiarities extraordinary and alarming. For the cold fit was accompanied by spasm and stiffness of the whole body; the jaws being fixed, the eyes staring, and the pulse very small and weak.—In many cases, delirium was added to spasm, under both which symptoms the patient laboured quite to the end of the paroxysm. And though the senses returned when the fever subsided, yet a convulsive twitching of the extremities continued, even in the intermissions, to such a degree, that it was not possible to distinguish the motion of the artery at the wrist.

“This fever had every kind of variety; and, whether at its first accession it were a quotidian, a tertian, or a quartan, it was

GEN. II.
Anetus.
as communicated by
Reynolds.

General remarks hereon.

Sir George Baker's own account of 1780–1.

Symptoms peculiarly severe.

Peculiarly variable.

* Medical Transactions, vol. iii. art. xiii.

GEN. II.
Anetus.

Often raged in
high grounds
and not in low
grounds.

Among females
in the house
very rare.

Obstinate
resistance to
the bark.

Medical
treatment.
General charac-
ter of remedies
for intermit-
tents.

Antispasmodics
and tonics with
what views
employed.

Pungent an-
tispasmodics of
Bergius.

very apt to change from one type to another. Sometimes it returned two days successively, and missed the third, and sometimes it became continual. I am not informed, that any died of this fever whilst it intermitted. It is certain, however, that many country people, whose illness had, at its beginning, put on the appearance of intermission, becoming delirious, sunk under it in four or five days. It is a remarkable fact, and very well attested, that in many places, WHILST THE INHABITANTS OF THE HIGH GROUNDS WERE HARASSED BY THIS FEVER, IN ITS WORST FORM, THOSE OF THE SUBJACENT VALLEYS WERE NOT AFFECTED BY IT. The people of Boston and of the neighbouring villages, in the midst of the Fens, were in general healthy, at a time when this fever was epidemic in the more elevated situations of Lincolnshire: and other examples of a like kind have already been noticed.* It is likewise singular, and worthy of notice, that, in many families, the female servants were nearly exempted from a disease which very few male servants, especially the labourers in the open air, escaped. But the distinguishing character of this fever was its obstinate resistance to the Peruvian bark; nor, indeed, was the prevalence of the disease more observable, than the inefficacy of the remedy. Though the quantities of the bark usually given were exceeded, the fit was apt to return, rarely altered, either with respect to the time of invasion, or the intenseness of the symptoms; and just as if no means had been used to prevent it. A drachm of the bark in powder was frequently administered every second hour, without averting the fit."†

In casting our eyes over the great diversity of medicines that have been employed for the cure of intermittents, we shall find, that, innumerable as they are, they may be arranged under two general heads, tonics and antispasmodics; as though, long before the time of Dr. Cullen, his two principles of the disease, debility and spasm, had been uniformly admitted and acted upon.

The antispasmodics, consisting chiefly of stimulants, sedatives, and relaxants, have been confined to the term of the paroxysm, with a view to weaken and shorten it; and the tonics, consisting principally of bitters and astringents, have been employed throughout the intervals, with a view of fortifying the system against a recurrence of the attack.

In discussing the medical treatment of intermittent fevers, it will be sufficient to limit ourselves to these two indications.

It was a favourite practice with Bergius to anticipate the cold fit, constituting the accession of the paroxysm, by pungent stimulants, in the hope that, if he could successfully combat this first stage, he should gain a complete victory, not only over the individual paroxysm, but over all future incursions. His favourite medicines for this purpose were garlic, mustard-seeds, and capsicum. And he boasts of having, in numerous instances, completely suc-

* Sir Gilbert Blane, *Select Dissertations*, p. 111. 8vo. Lond. 1822. In order to form a correct judgment of this part of the subject, we should have been informed of the state of the weather, not merely in respect to temperature, but quantity of rain that fell in the different places alluded to. The occurrence of ague sometimes in high situations, while it ceases in lower ones, will admit of explanation on principles already noticed in a preceding note. — Ed.

† Med. Trans., loc. citat.

ceeded, with each of these; though he admits that the mustard seeds answered best in vernal intermittents, but did not in general, prove sufficient for the autumnal quartans. The Indian practitioners, I may here observe, employ chakka or ginger, and sometimes the sison ammi for the same purpose, and Dr. Chisholm has occasionally succeeded with scallions.* Bergius, however, placed his chief reliance on the capsicum, six grains of which he was in the habit of giving, combined with two scruples of bay-berries in powder, "incipiente primo rigore;" and of repeating it every day, at the same hour, for three or four times in succession. And he assures us, that he has very frequently seen obstinate intermittents removed by this powder, and without any relapse.

The practice, however, has not been equally successful in other hands; not even when capsicum has been given in a much larger quantity, or exchanged for ammonia, treacle-mustard (*clypeola jonthlapsi*), or black or white pepper, the latter of which is only the former denuded of its outward tunic, mixed up with brandy or hollands. They have all, indeed, sometimes answered, but the result is uncertain; and, as was long ago observed by Van Swieten, if the medicine do not succeed upon a full dose, and especially when combined with ardent spirit, it will often extend its influence to the hot fit, and greatly exacerbate it; and not unfrequently convert an intermittent into a continued fever. Upon the whole, therefore, this plan is not to be recommended, however varied. The least pernicious material is the ammonia; but then it is also the least effective.

A large draught of cold water has been not unfrequently had recourse to for the same purpose, and also, in a few instances, with success. The object is, by taking it about half an hour before the cold fit is expected, to excite a strong reaction and powerful glow over the entire system against the time when the cold fit returns, and thus to preoccupy the ground; and, by disturbing the regularity of the type, to subdue the intermittent altogether. But this plan has, perhaps, more frequently failed than the preceding: and when the shivering or horripilation produced by the cold water has not been followed with a stimulant effect, as in delicate habits more especially, it has often continued so long as to run into the term of the febrile cold fit, and very considerably to increase its power. Ballonius relates a case in which it proved fatal.†

The next division of antispasmodics, which have been directed against the paroxysm, and especially against the rigor with which it makes its onset, is sedatives: and of these the chief have been opiates, which, when given in the form of laudanum, in a dose of from thirty to forty drops at the commencement of the chill, has;

GEN. II.

Anetus.

Indian practitioners;

Chisholm.

Ineffective in other hands.

Cold water as an antispasmodic.

Sedative antispasmodics, especially opium.

* Climate and Diseases of Tropical Countries, &c. - 1822, p. 53.

† Op., tom. i. p. 193. Venesection has been recommended as a means of shortening the cold stage, and of preventing the hot stage, or lessening its duration and violence. Dr. Macintosh, in his work on the Practice of Physic, is in favour of such treatment. On the other hand, Dr. Stokes rather disapproves of venesection in the cold stage; though he admits that it is beneficial in removing the symptoms of congestion about the chest and abdomen. (Edinb. Med. and Surg. Journ., 1829.) Dr. Elliotson has never seen a case of ague which required venesection in the cold stage. Lect. at Lond. Univ., Med. Gaz. 1832, p. 2. — ED.

GEN. II.
Anetus.
Medical
treatment.
Trotter's use
of opium.

in many cases of intermittents, been highly beneficial; diminishing the duration of the stage, and moderating its symptoms. Dr. Trotter says, that he practised this plan with general advantage in an epidemic intermittent that attacked the Vengeance, one of the Channel fleet under Lord Howe: and adds, that, "if the first dose of opium did not produce a sensible relief and exhilaration of spirits in half an hour, he repeated it, and never found it necessary to go beyond a second dose." Sir Gilbert Blane adverts to the same plan, as pursued at Walcheren during the English expedition to that island, and with an equal success.*

Lind's.

We have already seen, however, that there is some cause or other, probably the peculiar temperament of the atmosphere at the time, that baffles on one occasion the remedy that has best succeeded on another. And hence opium has often failed in other intermittents in every form, but especially when given in the cold fit. And owing to this diversity of effect, Dr. Lind thought it most useful in the hot fit; and asserts that, if administered to the extent of twenty or five-and-twenty drops of laudanum half an hour after the beginning of the hot fit, it produced the advantage of shortening and moderating the heat, calmed the anxiety and headach, which are usual concomitants, expedited the sweating stage, made the paroxysms more regular, and sometimes stopped the fever altogether.

Relaxants as antispasmodics.

Other physicians have commenced with relaxants: and where these are selected, the antimonial preparations are to be preferred to ipecacuan. They tend more directly towards the surface, and, where it is useful to excite vomiting, which is often the case, they act sooner, and maintain the action longer, and hence make a double effort to accelerate the sweating stage. The antimonial preparations differ chiefly from each other by having the reguline part of the antimony they contain in a more or less fusible state; and their operation will often vary according to the quantity or quality of the acid they meet with in the stomach; and hence the different effect of the same preparation in different persons, and even in the same person at different times.

Antimonials.

The same preparation often affects different individuals differently.

Relaxants combined with opiates.

The most efficacious practice which I have witnessed, consists in uniting relaxants with opiates; and, where this joint effort is pursued, ipecacuan may answer as well as any of the preparations of antimony. We cannot have, for this purpose, a more useful medicine than Dover's powder; and it should be commenced with much earlier than is consistent with the usual practice, so as not to regulate the hot and sweating stages, but to anticipate the cold fit. And we may still farther add to the ingredients of the medicine a full dose of ammonia with great advantage; for, it is in this form, if in any, that we can employ stimulants with a certainty of doing little mischief, and very nearly a certainty of considerable benefit. In the case of a quartan in St. Thomas's Hospital which had lasted two years, Dr. Fordyce determined upon this plan; and prescribed a full dose of Dover's powder with a sweating draught of carbonate of ammonia two hours before the paroxysm was

Case successfully treated by Fordyce.

* Select Dissertations, &c. p. 105. Lond. 8vo. 1822. Dr. Elliotson has given opium with very great success; yet, says he, "if I found great congestion of the head, or other parts, I would order bleeding in preference to opium."
— Ed.

expected. It succeeded perfectly. A profuse perspiration anticipated the period of the cold fit, and hereby entirely prevented it; bark was next given freely, and this obstinate ague was cured in a few days.*

Whatever be the relaxant or sudorific employed, it should be assisted by plentiful potations of warm diluents, and by placing the patient between the blankets, instead of in the sheets of his bed: for, I have already had occasion to observe, that upon these auxiliary means depend, in many instances, the accomplishment of the object we have in view, without which the most urgent diaphoretic exerts itself to no purpose.†

The most important season, nevertheless, for medical operation is in the intermission of the paroxysms: since, however successful we may be in moderating the febrile attack, it is rarely that we can depend upon any plan, which may then be adopted, to prevent a recurrence of the fit.

The opinion of mankind seems to have concurred in most ages, in regarding debility as either the proximate or predisponent cause of intermittents, since almost the only medicines that have been brought forward to guard against the recurrence of their periodic attacks have been TONICS, with the sensible qualities of bitterness or astringency, or of both.

In what way these act upon the moving fibre at any time, and particularly in the disease before us, we cannot say with any degree of precision. The tone of the moving fibre depends unquestionably in some degree upon the state of the fibrous material itself; but perhaps in a much greater degree upon the state of the nervous influence. We have great reason for believing, that astringents, in producing tone, act upon the fibrous material itself, for we find them operating in like manner upon animal fibres both in a living and a dead condition. But whether, as Dr. Cullen conjectures, it be the part of bitters alone to act upon the nervous power or living principle, and especially in the very singular manner in which he represents them as acting, is a different question; and the present is not the place for entering upon it.

If we contemplate the brain and spinal marrow as the sources of nervous energy, we can readily conceive that the component parts of these organs, as well as of any other, may be invigorated by medicines that have a peculiar influence on their structure; and that, consequently, such organs may be rendered capable of distributing the nervous power in greater abundance, or of producing it in a more elaborate perfection. And we can also readily conceive, that such effects may be produced by both bitters and astringents, as well as by medicines that possess some other sensible qualities, though these are the most obvious in their operation.

* Edinb. Med. Comment., vol. vi. p. 359.

† Dr. Elliotson conceives, that in the cold stage the plan of surrounding the patient with hot air, would be better than putting him into the warm bath, as is sometimes done. Air in any quantity, and of any temperature, may be conveyed under the bedclothes, by means of something like an inverted funnel, a tube, and a spirit-lamp. Dr. Elliotson has also a favourable opinion of the usefulness of friction. The warm drinks which are given, he thinks, should not contain wine or brandy, as such stimuli would be likely to increase the subsequent hot stage, bring on delirium, and cause congestion and inflammation of the head and internal organs. — Ed.

GEN. II.

Anetus.

Medical treatment.

Diluents and other auxiliary means.

Period of intermission chiefly to be depended upon.

Tonics, and their properties as bitters and astringents.

In what way they act.

GEN. II.

Anetus.

Medical
treatment.Cullen's hypo-
thesis unsatis-
factory.

But should we, with Dr. Cullen, affirm that the same bitter, employed in the same proportion, produces both tone and atony, energy and debility; that it both cures the gout, and occasions it; that employed for a certain time it effects the former, and, after such time, the latter; and should we beyond this affirm, with him also, that the nervous energy is not the production, but an inherent power, of the brain; that it admits neither of increase nor diminution; is changeable in its state, but unchangeable in its essence; becomes excited and collapsed, or rises and falls in its energy, but experiences nothing of the decomposition, or recruit of every other part of the living frame around it; we should travel into a labyrinth of incongruities, and only enlighten ourselves with a will-o'-the-wisp. Dr. Cullen's system, like himself, is a work of no ordinary stamp; it is full of immortality, but mixed up with weak and perishable materials.

Cinchona.

Of the remedies appertaining to the one or the other of the two divisions we are now considering, those of astringents and bitters, the cinchona, or Peruvian bark, which unites both qualities in itself, is on every account entitled to our first attention.

This valuable medicine, which some practitioners are apt to despise or think lightly of in the present day, has never been altogether without its opponents; and there are many facts respecting its operation, which, if not altogether anomalous, are of very difficult solution.

History of its
introduction
into Europe.

Peruvian bark, according to the authority of Don Joseph Ville-robel, a Spanish physician noticed by Badus, was first brought to Spain in the year 1632; but here, as in every other country, it had for a long series of years to encounter the prejudices of the medical profession; and consequently was very rarely made use of, and unquestionably would have sunk into oblivion but for the activity of the Spanish jesuits, who continued zealously to recommend it, and to import large quantities of it from their brethren in South America. Through these means, it was at last recommended by Pope Innocent X., in 1661, as a medicine perfectly innocuous and salutary: and a *Schedula Romana*, drawn up under the sanction of the physician to his holiness, pointed out, in express terms, the time and proportion in which the bark was to be taken. Unfortunately the time stated was *frigore febrili incipiente*, "at the commencement of the cold fit:" and it being administered in this manner, with only temporary benefit, to the Archduke Leopold of Austria, a year or two afterwards, it immediately fell into great discredit with a very large and learned part of the medical community of Europe; and a most acrimonious warfare was instantly waged in every quarter on the subject, in which the combatants on both sides seemed more desirous of victory than of truth.

When intro-
duced into
England.

In our own country, the bark began to become popular about 1655. In 1658, Mr. Underwood, an alderman of the city of London, died while using it, and was instantly reported to have fallen a sacrifice to its power; and so prejudicial was the effect of this rumour, that Cromwell, who was attacked with an ague in the same year, was suffered to languish and at length to die without an exhibition of the bark, his physicians being afraid to make a trial of it, in consequence of the fatal accidents that had so

lately accompanied its use: in the words of Morton, “nondum vires corticis in hoc veneno subigendo, saltem hic loci, comprobatae erant.”*

In England, therefore, as well as on the continent, there was a great conflict of opinion. Dr. Prejean, who both preceded and succeeded Dr. Harvey as president of the College of Physicians, appears openly to have advocated its employment in 1658, according to facts adverted to by Sir George Baker in his admirable article on intermittent fevers†, from which these hints are chiefly drawn up. Dr. Brady, professor of physic at Cambridge, appears equally to have countenanced it; as does Dr. Willis, according to his own statement: while Dr. Morton professed himself inexperienced upon its virtues, and Dr. Sydenham was decidedly adverse to its use.

Sydenham, however, was a man of reason and liberality. His prejudices, and especially those derived from the hypothesis, that a fever is a fermentation in the blood, raised by nature to throw off some peccant matter at the surface, and which ought not therefore to be checked in its course, however wise it may be to moderate it in its violence, were all at arms against the use of the bark under any circumstances: and the mischievous effects, to which he had been an eye-witness in some instances, and its total inertness in more, gave a sanction to suspicion, if it did not justify hostility. But he was determined to watch it for a still longer period through all its variable effects, and to abide by the result when fairly cast up. He soon became sensible that it was, in most cases, a powerful engine; that, in many instances, it was highly serviceable; and that, in those in which it failed, the miscarriage was rather to be ascribed to some error in handling it, than to a want of power in the drug itself.

Sydenham had sufficient ground for this last conclusion. The mode in which it was, at this time, usually administered was in doses of two drachms given twice in the twenty-four hours; and, as already observed, the time selected for the purpose was during the existence of the paroxysm. It is, moreover, highly probable that it was sometimes considerably adulterated, from the difficulty of obtaining it in any considerable quantity.

In 1658, we learn from Sturmius, who warmly patronised its use, that pure bark was so scarce on the continent that twenty doses of the powder were sold at Brussels for sixty florins, for the purpose of being sent to Paris; and that this order so completely exhausted the apothecary's stock, that he himself was incapable of obtaining any even at that price. And hence, for the use of one patient, who was attacked with an obstinate intermittent fever in the month of February of the same year, he was obliged to wait till the June following before he could obtain a supply.‡ Nor was it less difficult to be procured at Brussels than in many other parts of Europe; for Bartholine, then residing at Copenhagen, having received as a great rarity a present of three doses, or six drachms, of the powder from some friends who had brought it from Italy, was induced to make a trial of it on a lady who had a quartan

GEN. II.

Anetus.

Medical treatment.

Begins to be countenanced.

Candour of Sydenham.

Its progress checked by an improper administration; by being often adulterated.

Its great scarcity at first.

* Pyretolog., p. 17.

† Medical Transactions., vol. iii. art. xiii.

‡ Febrifugi Peruviani Vindicium Pars prior, p. 84. Antwerp, 1659.

GEN. II.
Anetus.
Medical
treatment.

fever. Of this small portion, the first dose, or two drachms, was rejected from the patient's stomach; and, in order to prevent a repetition of this accident, and consequently the loss of his entire stock, the administrator macerated his two remaining doses in wine for forty hours, and gave the infusion *during two successive paroxysms*. The only effect was, that the fever was changed from a double to a single quartan. And here the experimenter was obliged to stop, as having no more materials to proceed with.* But, even in 1678, when the same pretext for sophisticating it no longer existed, Morton complains that the bark offered for sale was become so inert, corrupt, and adulterated, that it was necessary to increase the proportion from two drachms, to one, two, or even three ounces for a single dose. And, thus given by wholesale, we cannot wonder that still more mischief should result from its abundance than from its scarcity, whatever might be the purity or impurity of its quality.

Sydenham's
regulations.

To guard against all the evils that seemed to accompany its use, Sydenham proposed to himself the following regulations:—

First, To be peculiarly cautious in the quality of the bark he employed; and to allow of no intermixture, whether from fraud or a view of increasing its virtue.

Secondly, To administer the bark in the intervals, instead of in the paroxysms of a fever.

Thirdly, To give it after the rate of two scruples every four hours, instead of two drachms twice a day after the *Schedula Romana*.

Under these regulations, the bark seems to have acquired all the success to which it has at any time pretended; and modern practice has added little to their value.

Administration
in the apyrexia,
by whom first
suggested.

The most important of them is that which effected a change in the period of exhibiting the bark. But, whether the merit of first suggesting this improvement be due to Sydenham, or to some contemporary of his, we cannot at present very accurately determine. He is, indeed, the only person who openly lays a claim to it, and asserts that he was led to this alteration after deeply pondering the subject—*diu multumque apud se agebat*: yet Morton, who published his *Pyretologia* in 1692, only three years after the death of Sydenham, asserts, somewhat loosely indeed, that, during twenty or five-and-twenty years†, he had been in the habit of giving this antidote, as he calls it, in every season of the year, and to persons of all ages and constitutions; that he had cured every species of intermittent with it quickly and radically, and had found it more expedient to give it in the intervals than in the fits. While Lister, who was contemporary with both Sydenham and Morton, and who treats neither of them with respect, directly accuses Sydenham, a few years after his death, of having copied his mode of giving the bark from the miserable mountebank Talbor, who was its inventor;—*auctore suo, misero illo, agyrtâ Talbor.*‡ Talbor, or Tabor, however, is scarcely open to the stigma of being a mountebank. He concealed, indeed, his preparation of the bark, but he had been

Morton's
practice.

Tabor's success,

* Thomæ Bartholini Hist. Anat. et Med., cent. v. hist. l. Hafniæ, 1661.

† Pa. 114. 132.

‡ M. Lister, *Octo Exercitationes Medicinales de Cort. Peruv. exhibendi tempore*.

regularly initiated into a knowledge of medicine by an apprenticeship to an apothecary at Cambridge; was the most successful, and, therefore, the most popular employer of the bark in his day; acquired a higher reputation in this line of practice than any other individual whatever; was appointed one of the physicians to Charles II., against all the influence of the college; was specially sent for to Paris to take the Dauphin under his care; succeeded in curing him, and afterwards divulged his arcanum, for a stipulated sum, to Louis XIV., by which it was found to be an infusion of the powder of bark in port wine as a cordial.

The best form of administering it used to be considered its powder, "*potissima virtus in toto jacet*," says Professor Frank. But it is often found that the stomach will not bear it in this form; and hence, modern chemistry has been at work to provide various others, the best of which appear to be those which consist of its essential principle, now sufficiently ascertained to be a peculiar bitter alkali, separated from the woody fibre, and neutralised into a salt by means of sulphuric acid. The French chemists have put us into possession of two distinct salts of this kind—QUININE and CINCHONINE, of which the former is the more powerful, and both appear to have been employed with great success in the removal of intermittent fevers, in cases where the stomach has uniformly rejected both the gross powder and the decoction.* The dose of the first, for an adult, may vary from two to five grains and half a scruple, and still more has been given without ill effects: of the second, the dose may be from ten grains to half a drachm. The ordinary ill-effects from an over-dose are, nausea, headach, and vomiting.† [It is related by M. Andral that, in some cases of tertian ague, M. Lerminier gave between 16 and 17 grains of the sulphate, the first day of the treatment. The fever was arrested, and no unpleasant symptom followed. In some other individuals, similarly affected, this medicine, in the dose of only a few grains, produced violent palpitations, oppression, globus hystericus, giddiness, and fugitive pains in the chest and abdomen. This he imputes to idiosyncrasy.‡ But, as Dr. Elliotson observes, quantities that can disagree are not required: five grains of the sulphate, every six hours, is the largest dose that can be necessary, at least in this climate; for, from the reports of Professor Speranza, doses of 12, 24, and 30 grains are common in Italy; and, in one case, 108 grains were given as a dose, before the fever was arrested. The medium dose, prescribed by Dr. Perrine, of Adams County, in America, is eight grains every hour.§ Many cases of intermittent fever in England have been cured with three, two, or even one grain, every six hours.|| Every case of ague which the editor has met with in the prisons of the King's Bench and Fleet has yielded to doses of two grains. Dr. Elliotson has also tried the simple quinine, the tonic properties of which he considers as corresponding to those of the sulphate. It never disordered the

GEN. II.

Anetus.

Medical treatment.

and reputation.

Different forms and preparations.

Its essential principle, a bitter alkali.

Quinine and cinchonine.

Effects of an over-dose.

* De Cur. Hom. Morb. Epit., tom. i. p. 64.

† Magendie Formulaire pour la Préparation et l'Emploi de plusieurs Médicaments, p. 49. Paris, 1822.

‡ Andral, Clinique Médicale, tom. i. p. 488.

§ See Edinb. Med. Journ., No. xciv. p. 218.

|| Elliotson in Med. Chir. Trans., vol. xii. p. 56.

GEN. II.
Anetus.
Medical
treatment.

stomach, though given in doses of ten grains every six hours. One fact, adverted to by the same physician, is important, namely, that the foregoing medicines cure cases of intermittent fever which resist bark, even when retained in the stomach, and freely administered. In a later communication on this subject, Dr. Elliotson mentions having attended nearly 150 cases of ague, and treated all with the sulphate of quinine. Many were combined with so much inflammation in the abdomen, chest, or head, that venesection was necessary; some with dropsy, and others with chronic diseases of the lungs, or liver; but, *every one was cured*. Having never found the sulphate of quinine augment inflammation, or interfere with antiphlogistic measures, he has always given it under all circumstances, and adopted with it any other measures required by the symptoms. Some cases, generally quartans, would not yield to less than five grains every four hours; but this quantity never failed, after being exhibited a week or ten days.* In London, he finds that the disease may be generally arrested *immediately* by the exhibition of ten grains at once, just before or after the paroxysm. Dr. Home, he remarks, found the bark much more successful after, than before, the paroxysm; and this, also, is his own experience with quinine. He is convinced that the best practice is, first to give ten grains, as soon as the paroxysm is over. Excepting in quartans, this almost always prevents the paroxysm next expected, and, if repeated daily at the same hour, often cures the disease. But, he says, it is sometimes necessary, in addition to these ten grains after the fit, to give small doses every six or eight hours, so as to make the whole quantity in twenty-four hours amount to a scruple or half a drachm.† From what has been said, it would appear that the quantity of quinine and cinchonine contained in any one kind of cinchona, is the test of the comparative virtue of the different species; that the absence of these alkalies in vegetables which have been proposed as substitutes for cinchona, shows their difference, and accounts for their inferior efficacy; while others, in which these alkalies are found, may supplant the cinchona. Thus, the experiments made by MM. Robiquet and Petroz prove the existence of an alkali analogous to quinine in the bark of *carapa*, which has been known in America to cure agues, though they had defied the power of cinchona.‡

Carapa contains a principle analogous to quinine.

Sulphate of quinine applied externally.

From the investigations of M. de Martin§, it appears, that when the sulphate of quinine is finely pulverized, mixed with cerate, and then applied to a blistered surface, it is soon absorbed,

* In February, 1829, Dr. Elliotson had a patient labouring under quartan ague, which did not yield to less than 45 grains in the 24 hours. He thought this a very considerable quantity; but, on his return from the continent in the ensuing October, he found a patient in the hospital, who was taking, by direction of Dr. Roots, a scruple every eight hours, with ten minims of liquor arsenicalis. The case, which was a quartan ague, did not yield to such doses, until they were given every four hours, and then the disorder immediately ceased. (Lectures, &c. Med. Gaz. for 1832, p. 4.) No general rule can be laid down respecting the quantity of sulphate of quinine which may be required. — Ed.

† Elliotson in Med. Chir. Trans., vol. xiii. p. 464.

‡ See Quarterly Journal of Foreign Medicine, vol. iv. p. 68.

§ See Revue Médicale, Septembre, 1827.

and thus a cure of intermittents may be performed; a fact worth remembering in examples where the stomach is very irritable.*]

It ought to be known, that one of the best preparations for a successful use of the bark, is calomel in small doses, particularly in intermittent fevers. "I have known," says Dr. Baillie, "a good many cases in which bark alone would not cure an ague. In all of these cases, as far as I now recollect, when a grain of calomel was given every night for eight or ten nights, bark cured the ague in the course of a few days. This practice I learnt from my friend Dr. David Pitcairn."†

But as, under whatever form, in whatever quantity, and at whatever time the bark is given, it is not found to be a specific, not only in every individual, but in every intermittent, we are again driven to a principle I have already ventured to lay down, that intermittents of all kinds are occasionally influenced in their character by idiosyncrasies, or the temperament of the atmosphere. And it is hence of considerable importance to know what other medicines have the strongest claim to attention, when, from accidental circumstances, the best fails of its common effect.

This, as we have already had occasion to observe, was the case in the singular intermittents that prevailed both in this metropolis and in the country in the year 1787, in which the bark seemed to have no energy whatever, notwithstanding that its genuineness was sufficiently tested and proved; in consequence of which the febrifuge powers of various other medicines were attentively studied and appreciated. In some instances other medicines were mixed with bark, and seemed to a certain extent to call forth its proper power; a mixture of bark and alum answered in some cases, but produced disappointment in others. "The crude sal ammoniac," says Dr. Petrie, who was physician to the hospital at Lincoln, "had not a more certain effect. Several women were cured in a hospital by what is called the Dutch remedy for an ague; which is compounded of the bark and cream of tartar, each two ounces, and sixty cloves powdered. A drachm and a half of this powder was taken every third hour. Yet this likewise frequently failed. We at last thought, that we had fallen on a specific in the powder of bay-leaves, plucked from the tree and dried in the shade. It was given from one to two scruples in the beginning of the cold fit. This powder was very efficacious in preventing the fits in many cases, where the bark, in the largest quantity, had been unsuccessful. But almost all who used it had a relapse in the space of a fortnight, three weeks, or a month. One patient,

GEN. II.

Anetus.
Medical
treatment.

Cinchona not
always effective,
and why.

Hence other
febrifuges
should be
studied.

Mixture of
cinchona with
other medicines.
Petrie's practice
at Lincoln.

* Many persons when taking bark experience nausea, or even vomiting and purging; "and, in all such cases, a few drops of tincture of opium will frequently enable the stomach and intestines to bear it. If it be only the stomach that is disturbed, an effervescing draught will answer the purpose, and so will prussic acid. In the case of children, bark may be given in the form of clysters, and some persons have been cured, it is said, by its external application, by having it tied in fine muslin or linen, on different parts of the body. I recollect hearing Sir Henry Hallford say, that, when he was a child, he had ague, of which he was cured by wearing a jacket of bark. A double jacket was filled with powdered bark, and put next his skin." Professor Elliotson's Lectures at the London University. — En.

† Lectures and Observations on Medicine, by the late Matthew Baillie, M.D. 1825. Unpublished.

GEN. II.
Anetus.
Medical
treatment.

just at the time the fit was expected, took sixty drops of thebaic tincture. On this he fell into a profound sleep, sweated profusely, and escaped the fever, not only then, but at two successive periods. Eight quartans in the hospital, and four in private practice, were entirely cured by one drachm of the theriaca andromachi, the same of the root of calamus aromaticus in powder, and fifteen grains of salt of tartar. This mixture was taken in warm ale or wine and water, an hour or two before the fit. Nevertheless I must confess, that I met with several cases where no medicine prevailed; and many patients, despairing of relief, left themselves to nature; some of whom went into a pulmonary consumption, jaundice, or dropsy. Many, whom I thought cured of quartans, lately relapsed. I have now on the hospital books four patients, ill of quartan fevers, who have received no benefit; and I have no hope left, but in a long course of deobstruent bitters, and tinctura sacra, aided by the approaching summer.*

Morton's favourite remedy.

Morton's medicine, of one scruple of chamomile flowers, ten grains of salt of wormwood, and the same quantity of calax of antimony, given every sixth hour, is said to have subdued, in the metropolis, an obstinate tertian in two instances. And Dr. Heberden found, that two drachms of the powder of myrrh, taken just before the time of the expected fit, relieved a patient from an ague, which for a long time had resisted the power of the bark, though taken in very large quantities.

Red-bark first introduced, but found oppressive:

The red-bark was now also tried for the first time: it was proved to be of unquestionably superior virtue to that in common use; but even a moderate dose of it so often oppressed the stomach and excited nausea and vomiting, perhaps produced by its containing a larger proportion of resin, that, writing at this very period, Sir George Baker tells us, "I have for some time avoided the use of it." It contains, however, by far the largest proportion of quinine, and is now usually selected for this purpose.

but contains most quinine.

Other barks employed in India.

Swietenia.

Azedarach.

Tellicherry.

In the East a variety of other astringent and bitter barks are also employed both by native and European practitioners, and apparently with considerable advantage; as that called, in honour of Van Swieten, *Swietenia febrifuga*, so warmly recommended by Dr. Roxburgh: that of the bead-tea (*Melia Azedarach*), and the Tellicherry bark. All these have been now tried in Europe, but with a far less success than in India.

Arsenic generally injurious as at first employed.

Arsenic was also tried, in combination with opium. It is admitted that it often effected a cure; but was frequently productive of violent vomitings, colic, and dysentery. It seems, however, to have been given at this period in a somewhat rude and unscientific form. "Arsenic," says the distinguished writer whom I have just cited, "is mentioned in books as a febrifuge, but it is one of those substances of which we are not as yet so far masters, as to be able, by any art, to render it transferable from the list of poisons to our Materia Medica; and it cannot be deemed to be a proper remedy for an intermittent fever, whilst an intermittent fever is less formidable than arsenic." But to this substance we shall have to return presently.

Bitters employed since.

The chief BITTERS and ASTRINGENTS that have been called into requisition, independently of those already noticed, are, gentian,

cascarilla, willow-bark, nux vomica, and the leaves of the cherry-bay, or *Prunus lauro-cerasus*; the chief ASTRINGENTS, tormentil, galls, and oak-bark; the bark of both species of the swietenia or mahogany tree; avens or caryophyllata (the *Geum urbanum* Linn.), the *Lycopus Europæus* of the same naturalist, called in Piedmont, where it is supposed to rival the bark, herb China, alum, and several of the metallic oxydes.

To all these a common remark may be applied, that, where they have been of real service, it has generally, though not in every instance, seemed to arise from their uniting the two qualities of a bitter and an astringent, and that they have rarely answered where there has been only one of these qualities to depend upon. Thus tormentil, one of the most powerful vegetable astringents we possess, and gentian, one of our most powerful vegetable bitters, succeed so rarely alone, that no dependence is to be placed upon them; but when given in combination, they almost rival the virtue of cinchona, and have occasionally succeeded where the latter has failed. "Joined," says Dr. Cullen, "with galls or tormentil, in equal parts, and given in sufficient quantity, gentian has not failed in any intermittents of this country in which I have tried it."*

There is, however, a principle, independently of bitterness and astringency, that seems absolutely necessary to enter into conjunction with these, in order to give full efficacy to any medicine employed as a febrifuge in intermittents; and a principle that has hitherto eluded all research; [unless it be analogous to that of quinine, a principle similar to which has been detected in other barks besides the Peruvian.] If the cure depended upon the intensity of a bitter and an astringent quality alone, galls, oak-bark, and mahogany-bark ought to succeed better, not only than an union of tormentil and gentian, or chamomile and alum, which have also been found very serviceable, but than cinchona itself; which every one knows they do not; although, when Peruvian bark cannot be obtained, they become desirable substitutes.

The nux vomica and Ignatius's bean (*Strychnos nux vomica*, and *Ignatia amara* Linn.) combine, with an intense bitter, a most active narcotic virtue; and how far the last may be peculiarly opposed to a recurrence of that spasm on the extreme vessels, which constitutes the cold fit, it is difficult to determine. M. Bourieu† from his own practice strongly recommends the latter, and Paullini‡ and Aaskow§ the former. If Dr. Fouquier's remark be well founded, which we shall have occasion to notice more at large when treating of paralysis, that these poisons have a power of augmenting energy in debilitated muscular fibres, while they leave those in health unaffected, we can account for some part of the success which has been so vauntingly ascribed to them in the case of intermittents. But, notwithstanding that they have been for this purpose before the public for upwards of a century, the infrequency of their use is a strong argument that they are not much entitled to commendation. "In a very small dose," says Dr. Cullen, "the faba Sancti Ignatii has the effect of curing intermittent fevers."||

GEN. II.
Anetus.
Medical
treatment.

Generally unite
an astringent
principle.
And hence
chiefly useful.

But the most
useful possess
some further
unknown
principle.

Nux vomica.

* Mat. Med., part ii. ch. ii. p. 72.

† Hist. de la Société R. de Méd., 1776, p. 340.

‡ Cent. iii. obs. 45.

§ Ant. Societ. Med. Hafn., tom. ii.

|| Mat. Med., part ii. ch. ii. p. 76.

GEN. II.

Anetus.
Medical
treatment.

Fatal case
from its use.

Lauro-cerasus.

Bitter almonds.

Prussic acid.

Metallic
oxydes.

Mercury.

Prussiate of
iron.

Arsenic.
Its use im-
ported from
India.

But whether he reports this from his own practice, or from that of others, we cannot exactly determine: nor does he tell us what is the small dose he refers to. I have tried the *nux vomica* to the extent of eight grains in powder every six hours for an adult under palsy, without any mischievous effect except a slight stupor in the head. And much beyond this we cannot proceed with prudence. Hoffman gives the case of a girl of ten years of age, who was killed by taking fifteen grains of it, divided into two doses, for an obstinate quartan.*

The *lauro-cerasus* was at one time, as we are told by Dr. Brown Langrish, a common medicine in his neighbourhood for the cure of agues†, but he takes no notice of the dose or mode of administering it. Its properties are nearly the same as those of bitter almonds; and Dr. Bergius frequently prescribed an emulsion of bitter almonds with success in intermittents, in the quantity of a pint or two daily during the intermission; and it sometimes cured where the bark failed.‡ This is an authority worth attending to; and as the same medicines are said to have a peculiar power of resolving visceral obstructions, they have an additional claim to a cautious series of experiments. It is known, in the present day, that their poisonous property depends upon their containing a portion of native prussic acid; [and consequently the latter would now generally be prescribed by those, who desire to ascertain its power over ague.]

The only metallic oxyde really worthy of notice is that of arsenic; for although various oxydes of iron, mercury, zinc, and copper, have been tried, and occasionally extolled, none of them have proved so decidedly beneficial as to render it worth while to try them over again.

Mercury, as we learn from Sir James Johnson, was tried extensively some years ago at the *Bocca Tigris* in the East, on the crews of two ships of war, the *Grampus* and *Caroline*, in consequence of the stock of bark being exhausted. The paroxysms, he tells us, were invariably put a stop to as soon as the system was saturated; but he adds, that three-fourths of the patients, thus treated, relapsed as soon as the effects of the mercury had worn off; and this after three, and, in a few instances, four successive administrations, so as to excite ptyalism.§

Iron, though of little value in most of its forms, has been said of late to have succeeded completely in that of its prussiate. Dr. Zollickoffer has given various instances of this in a foreign journal, and places its powers above those of arsenic or bark. It must be tried, however, upon a much larger scale before it is entitled to an established reputation. The ordinary adult dose is about four grains, two or three times a day, in a little sugar and water.

Arsenic, under various forms, has been employed from a very early period.¶ It is, strictly speaking, an oriental medicine, and has been in vogue immemorially in India, and indeed all over the East, but especially among the Tamul practitioners, as a most powerful alterant, as we shall have occasion to notice more at

* *Philos. Corp. Hum. Morb.*, p. ii. cap. viii.

† Experiments on Brutes. See also *Phil. Trans.*, No. 418. 420.

‡ *Mat. Med.*, p. 412.

§ *American Medical Repository*, July, 1822.

¶ *Act. Med. Berol.*, Dec. 1. tom. iii.

large when treating of syphilis and elephantiasis. It was probably introduced into European practice by the medical students under the brilliant caliphate of Bagdad; and seems to have been first appropriated to the cure of intermittents by the Jewish physicians of Poland.* In Sir George Baker's time, we have seen that it was in extensive use, but productive of such very different results, that, however successful it might prove occasionally, this distinguished pathologist thought it a worse evil than any ague whatever. At that period, however, it does not appear to have been tried in its most commodious forms, which are those of an arsenite or arseniate of potash. M. Macquer recommends the latter; Dr. Fowler, many years ago, introduced and gave abundant proof of the utility and general commodiousness of the former; and, under this modification, it has at length found its way into the Pharmacopœia of the London College, under the name of liquor arsenicalis. Sir Gilbert Blane tells us, that it was used with great success in our unfortunate expedition to Walcheren, where the stomach could not retain the bark: but was combined with opium, and, in most cases, with bitters and aromatics.†

The cases of success from the use of this medicine are so numerous, and its employment is now become so general, as to render it unnecessary to advert to particular authorities in proof of its febrifuge power. With many constitutions there can be no question that it disagrees very considerably; and there are numerous instances of its failure: but it is a medicine of real and inappreciable value in many diseases, and in none more than in intermitting fevers. Dr. Fowler advises it to be taken in doses of from two to twelve drops, according to the age and strength of the patient, once, twice, or oftener, in the course of the day: and the directions are so broad, and at the same time so much within limit, that no actual harm can occur from following them literally. It will, however, often be found advantageous to combine a few drops of tincture of opium with each dose, to guard against the vomiting and griping which it is sometimes apt to excite; and the bowels should be kept open by warm aperients during its use. Under the French Directory a similar preparations of arsenic formed a part of the political constitution of the day; for an edict was formally published, commanding that the surgeons of the army of Italy should, within the course of two or three days, cure the vast number of soldiers suffering from agues caught in the marshes of Lombardy, by the use of this medicine, under pain of military punishment.‡

It is a singular fact, and ought not to be passed by without notice, that since the establishment of the large copper-works which are now carrying on in Cornwall, the intermitting fevers which used to be almost constantly present in the neighbouring marshes, are now rarely to be met with in any shape. It should hence seem, that the atmosphere is armed with a specific by becoming impregnated with metallic oxydes or carbonates; and that

GEN. II.
Anetus.
Medical
treatment.

Liquor arseni-
calis.

Often decidedly
useful, though
not always.

Advantage-
ously united
with opium.

Remedial
power of neigh-
bouring copper-
works.

Explained.

* Gilibert, Adversar. Pract. Prim. — Slevogt, Pr. de Permissione Prohib. et Prohibitione Permiss. Jen. 1700.

† Select Dissertations, &c. p. 105. Lond. 8vo. 1822.

‡ It is best to begin with two or three drops of the liquor arsenicalis, two or three times a day, and to increase the dose by degrees. As Dr. Elliotson suggests, this medicine should not be given on an empty stomach. — Ed.

GEN. II.
Anetus.
Medical
treatment.
Result of the
foregoing
enquiry.

Cornwall should be the spot recommended for change of air in many cases of chronic or other obstinate intermittents.

The result of this general survey is, that the cinchona (including its preparations, quinine and sulphate of quinine) offers by far the best remedy for intermittents of every kind; that arsenic is its best substitute; and that, where these fail, as fail they will occasionally, or if particular circumstances should prohibit their use, we must throw ourselves upon such other medicines as unite intrinsically, or by combination, a bitter and an astringent principle with a certain proportion of aroma or stimulant warmth.

It is at the same time clear, that a bitter and astringent principle are not the only, nor even the most effectual qualities for the cure of an intermittent; for the arsenical preparations contain neither of these in any prominent degree; while, as already observed, there are many medicines that possess them in far greater abundance than the bark, which have no claim to be put in competition with it as a febrifuge. In effect, of the three species of cinchona used officinally in the present day, the lance-leaved, pale or quilled bark (*c. lancifolia*), heart-leaved or yellow bark (*c. cordifolia*), and oblong-leaved or red bark (*c. oblongifolia*), the yellow, which, as we learn from Mutis and Zea, is the genuine febrifuge of Spanish America, and whose superiority to the rest has been abundantly proved in this country as well as on the continent of Europe, is very considerably less bitter and astringent than the red, and not more so than the pale bark: it has less resin than the first, and less gum than the second. Dr. Cullen preferred the red, but Zea's communications upon the subject* were not then published; and Cullen was not in possession of the experiments by which the statement of the latter has been confirmed. Sir George Baker, as already noticed, found the red bark produce so much oppression and nausea, that he was obliged to discontinue its use. It affords, however, the largest portion of quinine.

The most active
febrifuges
possess some
property not
yet ascertained.

Ordinary ad-
ministration of
the bark.

In administering the bark, little needs to be added to the rules laid down by Sydenham, and copied in a preceding page. Dr. Home has sufficiently shown, not only that the best time for commencing the medicine is soon after the paroxysm, but that it should be discontinued some time before a recurrence of the cold fit, since, if persevered in till its accession, this fit is almost uniformly rendered more violent.†

If in the proportion of half a drachm or two scruples to a dose, as recommended by Dr. Sydenham, or such other quantity as may sit without uneasiness on the stomach, it should not succeed, it should be tried in combination with some aromatic, or omitted altogether; and by no means be increased to the enormous quantities some practitioners have ventured upon, who seem to have conceived, that they could force the system to yield to its powers by the overbearing arms of weight and measure. It is singular that Borsieri should have so far lost sight of moderation, as to have prescribed occasionally from four to six drachms of the powder in a single draught. In the extremity of the yellow fever such doses have, indeed, been given, and perhaps with advantage,

* Annal. de Hist. Nat., tom. ii. Madrid, 1800.

† Clinical Experiments, 8vo. Edin. 1780.

but opium and old port, in large abundance, have been given at the same time.

It will also be judicious to abstain from the use of bark in every instance in which any of the abdominal viscera appear to be labouring under parabysmic enlargements, whether antecedently to its employment or during its use; and, in these cases, to alternate small doses of calomel with whatever tonic may be found to agree best with the system. [Yet, as the editor has already stated, the experience of Dr. Elliotson proves, that the sulphate of quinine may be given beneficially, whether such enlargements be present or not: it has no power of preventing the cure of inflammation, nor does it interfere with antiphlogistic means.]

Among the endemic intermittents of the present day particularly worthy of notice, are those in the neighbourhood of Rome, and especially about the Pontine marshes, which have often been drained to carry off the decomposing animal and vegetable materials that spread their *aria cattiva*, as it is called, over the whole of the Campagna. The disease hence produced is named, from its source, *malaria*. It is also found in like situations, and has the same name, about Syracuse, and other parts of Sicily. M. Rigaud de l'Isle has asserted, that the miasmatic particles, which infect the air in these places, are heavier than the air in its loftier and lighter strata, and may be separated from it. He has found an elevation of 300 yards, at the Pontine marshes themselves, a complete security from infection; and he proposes for those who reside lower to sift the air which they breathe, by wearing a fine silk gauze over the mouth and nostrils.* M. Brocchi has successfully employed the same remedy, and hence recommends sleeping under a fine mosquito net in all places where intermittents are endemic.†

GEN. II.

Anetus.
Medical
treatment.Where it should
be abstained
from.Malaria of the
Campagna.How guarded
against.

GENUS III.

EPANETUS.

REMITTENT FEVER.

SYMPTOMS STRIKINGLY EXACERBATING AND REMITTING, BUT WITHOUT INTERMISSION; ONE PAROXYSM EVERY TWENTY-FOUR HOURS.

THIS genus offers the three following species, which will be found sufficiently distinguished from each other by their specific characters:—

GEN. III.

- | | |
|--------------------|----------------------|
| 1. EPANETUS MITIS. | MILD REMITTENT. |
| 2. ————— MALIGNUS. | MALIGNANT REMITTENT. |
| 3. ————— HECTICA. | HECTIC FEVER. |

* Mém. de l'Institut. Royale de France, March 24. 1817.

† Dello Stato fisico del Suolo di Roma, &c. Di G. Brocchi.

GEN. III.
Epanetus.

Additional
proof that
marsh miasm
is not the only
cause.

Yet still the
common cause.

Human con-
tagion some-
times a cause :
and especially
of hectic of the
third species.

In the last, the remission is perhaps more perfect than in either of the others: and it serves to show how little foundation there is for referring all remittent as well as all intermittent fevers to the individual cause of marsh miasm: for it would be difficult, though, perhaps, not impossible, to find a single example of a genuine hectic originating from this source.* Marsh miasm, however, is the most common cause of the second, perhaps of the first species; though we shall presently find it probable that even here, and particularly in the second species, human contagion has also occasionally proved a cause, as it assuredly has in those cases of hectic fever, produced by perpetually attending upon, or sleeping with, a consumptive patient.

* The possibility of hectic fever arising from marsh miasm is a suspicion that may be dispensed with, as it is entirely destitute of foundation. There may be hectic fever in consequence of visceral disease, that has originated during an ague, and has not yet been cured; but as for malaria being ever itself the cause of hectic, the opinion is groundless. Perhaps, with the exception of remissions, hectic fever has no analogy whatsoever to what is commonly implied by remittent fever. As a judicious writer has observed, "remittent fever may be considered as holding a middle rank, as to external character, between intermittent and continued fevers; but, with respect to its nature, the localities in which it chiefly prevails, and the cause whence it principally, if not solely arises, it bears a closer affinity to the former than the latter. It may be regarded more properly as forming the mean degree in the scale of periodic or marsh fevers, of which intermittent and yellow fever constitute the extreme points. A more intense operation of the febrile cause than is required for the production of intermittent fever engenders remittent, and the more violent the latter, the more remote is its character from that of intermittent; or, in other words, the less perceptible the remissions. That a more powerful action of the morbid cause is demanded for the production of remittent fever, is indicated by the circumstance, that when periodic fevers are prevailing in certain countries, the permanent residents are often observed to have the disease in the form of ague only, and the mortality among them is small; but strangers, unhabituated to the climate and its diseases, suffer from remittents, with a proportionably greater loss of life. In more sickly seasons, remittents will be the prevailing form among both classes of persons; but strangers are more violently affected, and the mortality among them is greater. Its affinity to intermittent is shown, too, by the tendency which it has to pass into that form, and inversely, by the proclivity of ague to assume the remitting type." (Dr. Joseph Brown, in *Cyclop. of Pract. Med.*, art. *FEVER*.) From such facts and reflections an argument might easily be deduced, which would shake very much the hypothesis of malaria, or marsh miasm, and the contagious principle of human effluvia, being capable of exciting similar fevers. — ED.

SPECIES I.

EPANETUS MITIS.

MILD REMITTENT.

PULSE REGULAR THOUGH FREQUENT; DEBILITY SLIGHT; REMISSION DISTINGUISHED BY SWEATING, OR A CLOUD IN THE URINE.

THIS species occurs most frequently among persons of relaxed fibres, debilitated habits, and sedentary occupations; and is usually preceded by an irregular action of the alvine canal, flatulency, abdominal tension, dyspepsy, or some other affection of the viscera of the lower belly; and is hence called by Professor Frank, as well in the ensuing as in the present species, *gastric fever**, intermittent, remittent, or continued, according to the type it assumes. It occurs at all seasons of the year, but more frequently in the autumn; the ordinary temperament of the season uniting with the patient's infirm state of health, and thus adding an exciting to a predisponent cause. Fatigue, cold, or long exposure to the rays of the sun, are also, at this time, powerful concomitants, and quicken the appearance of the disease.†

The patient complains of drowsiness, and feels languid; is occasionally chilly, and afterwards flushed, but without perspiration; for the skin is hot and dry, the thirst considerable, commonly with nausea and a total loss of appetite. In the course of the day, but usually towards the evening, the pulse quickens, the heat increases, and at length terminates in a sweat, which, however, is sometimes only partial, rarely free and copious, and never critical: for, on its ceasing, the skin is still dry and heated, and the pulse accelerated. Sometimes the exacerbation occurs about noon, and sometimes in the middle of the night.

If the disease be left to itself, the symptoms augment in severity daily; the head occasionally, but more generally the liver, or some other abdominal viscus, gives proof of being loaded and oppressed, and the restlessness is intolerable; or a sudden cholera supervenes, and carries off the complaint by a salutary crisis.

This species seems to be primarily dependent upon torpitude, or obstruction in some one or more of the chylopoetic organs, and generally yields to a course of active purgatives, amongst which calomel ought to take the lead. These should be repeated two or three times a week, and the intervals be filled up with mild diaphoretics. The pulse will generally be found from ninety to

GEN. III.
SPEC. I.
Origin and
scope.

Gastric fever
of Frank.

Diagnosis.

Prognosis.

Medical
treatment.

* De Cur. Morb. Hom. Epit., tom. i. § 50. 99. 8vo. Mannh. 1792.

† Here no reference is made to the commonly received doctrine, that ordinary remittent fevers spring from the influence of marsh miasm, or malaria. Thus, as Dr. J. Brown has stated, remittent is the endemial fever of warm climates; but it is also met with in temperate regions, and in our own country, especially in seasons of unusual heat, and in those parts of it where, under ordinary temperatures, agues are prevalent. Cyclop. of Pract. Med., art. FEVER. — ED.

GEN. III.

SPEC. I.

Epanetus mitis.

a hundred strokes in a minute; but, as soon as it sinks below this, and the heat and dryness of the skin have yielded to a general softness, columbo alone, or combined with sulphuric acid, will easily complete the cure; though the disease not unfrequently runs on for ten days or a fortnight.*

Remittent fever of infancy.

The REMITTENT FEVER OF INFANCY, which is generally ascribed to worms, does not essentially differ from the present, regard being had to the greater irritability in early life. Worms, there can be no doubt, are sometimes the cause of this infantile fever, but perhaps rarely; and there is no instance on record of their having been traced in the bodies of those who have fallen victims to it. Dr. Hunter expressly declares, that he has often searched in vain. The ordinary cause is, crude accumulations in the first passages, whence the digestion proceeds imperfectly; there is great general irritation, with considerable languor: the belly becomes tumid and often full of pain: the food is nauseated: the head is hot, heavy, and often comatose; as though there were water in the ventricles, which is sometimes suspected, though without foundation: the skin is pale or livid, with occasional flushes in the cheeks. It is a singular fact, that, if the exacerbation or increase of fever take place in the night, there is wakefulness and perpetual jactitation; if in the daytime, drowsiness and stupor.†

Ordinary cause.

Symptoms.

Treatment.

Dr. Butter recommends, as an aperient, small doses of neutral salts, and, when the bowels have been opened, nitrate of potash; or, if there be considerable irritation, the extract of hemlock. Generally speaking, however, there is such a sluggishness in the peristaltic action of the bowels, as well as in the intestinal secretions, that neutral salts will not answer the purpose; and, in consequence, rather add to the irritation than carry it off. And hence, much stronger purgatives should be employed from the first; as calomel, resin of jalap, or gamboge dissolved in milk; and it may be safely prognosticated, that, till this plan is had recourse to, the disease will in most instances maintain its ground, if it do not make a fearful advance. But, with a course of brisk cathartics, in conjunction with perfect quiet, good ventilation, and light nutritive food, it will usually give way in a week or fortnight.‡

* Prescribe six grains of calomel, which are to be followed by an active cathartic, and a mixture composed of four grains of tartarised antimony and eight ounces of camphor mixture, three table-spoonfuls of which are to be given every fifth hour. As soon as the tongue becomes clean, the skin natural, and some considerable impression is made on the disease, the fourth part of the following mild aperient mixture, given three times a day, will complete the cure:—
R. Magn. sulph. ʒvj, infus. gentianæ comp. ʒvj, acid. sulph. dil. ʒj; ft. mist.—ED.

† “By *infantile remittent fever* is now commonly understood a species of fever to which children from one year old, up to ten or twelve, are very subject, characterised by one or more daily exacerbations and remissions, by pain of the belly, and sometimes also of the head, and by an unnatural state of the alvine discharges.” Dr. Joy, *Cyclop. of Pract. Med.*, art. FEVER.

‡ In France infantile remittent fever is treated as a species of gastro-enteritis. That the secretions from the mucous surface of the alimentary canal are in a depraved state, is a fact generally admitted; but whether in consequence of inflammation is a disputed point. Dr. Joy expresses his belief, that medicines which slightly increase and modify those secretions, will usually be attended with more success than the sole employment of directly antiphlogistic measures. (*Cyclop.*

SPECIES II.

EPANETUS MALIGNUS.

MALIGNANT REMITTENT.

PULSE SMALL, HURRIED, IRREGULAR; DEBILITY EXTREME;
OFTEN WITH SIGNS OF PUTRESCENCY.

EXTREME debility may be inferred from the symptoms of great weakness and irregularity of the voluntary motions; weakness of sensation; weakness and wandering of the mind; weakness of the pulse and of respiration; coldness and shrinking of the extremities, and a tendency to faint in an erect posture; nausea, vomiting, and a total disinclination to nourishment; difficult deglutition, depending upon an atony of the muscles of the fauces; involuntary excretions, depending upon an atony or paresis of the sphincters.

GEN. III.
SPEC. II.
Extreme debility how evidenced.

A putrescent state of the fluids may be determined from the following symptoms:—pulse quick and tremulous; heat of the surface sharp and pungent, giving to the finger a peculiar tingling for some minutes afterward; the skin parched, or soaked with sordid, fetid sweat; the smell offensive to a considerable distance; the breath hot and fetid; the mouth aphthous; the tongue clammy, fetid, livid, greenish-black; the lips swollen, puckered, cracked, and purple; the urine brown or blackish, and offensive; black discharge, often in profuse quantity, from the stomach; the stools blackish, colliquative, very offensive, parted with profusely and insensibly; the mind wandering; twitching of the tendons; swelling and tension of the belly; petechial spots, vibices, and hemorrhages from different parts, without proofs of increased impetus.

Putrescency of the fluids how evidenced.

This species may be traced under four varieties, each sufficiently marked by its own symptoms:—

| | |
|----------------------|---------------------|
| α Autumnalis. | Autumnal Remittent. |
| β Flavus. | Yellow Fever. |
| γ Ardens. | Burning Remittent. |
| δ Asthenicus. | Asthenic Remittent. |

The AUTUMNAL REMITTENT is that which so frequently shows itself in our own country, in the season from which it derives its name, with a strong tendency to assume the tertian or double tertian type: or, in other words, with striking exacerbations every other day, or, where the double tertian is imitated, every day, the exacerbations commencing at noon, and the duration being usu-

α E. malignus autumnalis.

of Pract. Med., art. FEVER.) In very obstinate cases, Dr. Hamilton combined calomel with opium and antimony. On the other hand, Dr. Clarke, after the exhibition of an emetic, and one or two active purgatives, prescribes bark. The editor has seen, in the public services with which he has been connected, many cases of this fever; and the practice which he has the most favourable opinion of, consists in giving at first calomel and James's powder, and a cathartic mixture, followed by small doses of rhubarb and the hydrargyrum cum cretâ. — Ed.

GEN. III.
SPEC. II.
α E. malignus
autumnalis.

Sometimes
mistaken for a
quotidian re-
mittent.

How distin-
guishable.

Return of the
paroxysm diffi-
cult to be ac-
counted for in
intermittents.

But less so in
remittents.

Fevers, why
more frequent
in the autumn.

The organs re-
laxed and weak-
ened generally
by the heat of
the season; the
liver particu-
larly;

whence conges-
tions and a dis-
turbance of the
circulating
balance;

ally under twelve hours; the intervals consisting of remissions, which, however, are not always very clearly determined. Where the double tertian type prevails, and the patient has to labour with two distinct sets of tertian exacerbations, it is obvious that one of these must take place every day, as it must occur in the remission of the other. Consequently, this variety is often mistaken for a quotidian remittent. But a little attention will point out the real nature of the disease. For, while the one set will usually be found distinguished from the other by evincing some difference in its duration or its violence, both will be distinguished from the quotidian by the time of their attack, which is at noon, while the quotidian attacks in the morning; and by the comparative brevity of the paroxysm, which is always under twelve hours, while that of the quotidian runs on towards eighteen.

The perfect apyrexia which takes place in the interval of intermittent fevers, gives the constitution a full power of recovering its energy and recruiting its sensorial supply; and hence there is great difficulty in accounting for a return of the paroxysm: I mean, in cases in which the patient is removed from the miasmatic atmosphere; for otherwise, the cause that commenced the disease will be present to continue it. Habit may possibly effect this after a recurrence of several paroxysms; but this will scarcely apply to the second, in which no habit can, with great strictness of language, be said to have taken place. In remittent fevers, however, something of this difficulty is removed; for the constitution, even during the remissive interval, is still struggling with disease, and has not an opportunity of recovering its sensorial power.

There is no perplexity in accounting for a greater tendency to febrile affections in the autumn than in any other quarter of the year; and this, whether we allow the operation of a specific febrile miasm from marshes or not. When the animal frame has for some months been exposed to the stimulus of a high atmospheric temperature, and not unfrequently, perhaps, to that of the direct rays of the sun, all its organs become relaxed and debilitated. The nervous energy is diminished, or, in the language of Dr. Cullen, is in a state of collapse; a general languor and inertness prevail over every part of the system, and most of the functions are performed feebly and laboriously. And hence, if debility be the first stage of the proximate cause of fever, this part of the cause is continually present. But this is not all: the calorific rays of the sun act more powerfully upon some organs than upon others; and most of all upon the liver. The liver is hence in a state of perpetual irritation; and an unusual proportion of bile is secreted, a part of which is very generally absorbed and carried into the circulation; and, in tropical climates, so large a part as to form one of the causes of that tawny hue, by which the skin is there characterised: and, as the greater proportion of the surplus often passes off by the bowels, we see an obvious foundation laid for that variety of diarrhoea, which we have already described under the epithet of *bilious*. The liver, moreover, becomes weakened and torpid in proportion to its degree of excitement, and hence more disposed to congestion; and where congestion or any other obstruction takes place in a large organ, there is instantly a disturbance in the balance of the circulating fluid; and a disturbance which, in so irri-

table a state of the general system as we are now contemplating, can rarely exist without fever, or a tendency to fever.

There is no question, that this general disturbance of the balance of the circulating fluid and increased excitement of the digestive organs may terminate in actual inflammation in some part of these organs, and especially in their mucous membrane *; and hence, those pathologists, who regard fevers of all kinds as consisting in inflammation, contemplate the remittent before us as an enteric, or gastric phlegmasia: but this, as we have already had occasion to observe, is rather to denominate it from its result, than from its essential nature, and to make the cause and effect change places: a remark which will apply to yellow fever, as well as to the present variety.

All this mischief is apt to occur in autumns of temperate climates, that are peculiarly dry, and uniform in the range of the thermometer. But it often happens, that even in the most temperate and healthy climates, like our own, the autumnal months are chequered with sudden vicissitudes of heat and cold: and the pools and rivers are suddenly inundated with equinoctial rains, overflow their banks, and cover a wide surface of land with stagnant water. And the animal frame has hence to contend against the dangers of invisible damps, and abrupt changes of temperature, as well as against solar excitement: all which become occasional causes of fever, operating upon a state of body already predisposed to its influence.

And, hence, even without the existence of febrile marsh miasm, we see sufficient causes for a more frequent appearance of fever in the autumn, than in any other season of the year: whence, indeed, one reason for its appearing in warm seasons in fleets that are cruising at a considerable distance from ports, as has been justly observed by Sir William Burnet.† But in many districts, perhaps even in some sporadic cases, we have reason to believe that marsh miasm does co-operate, and itself form the remote cause; and more especially where such cases are frequent, the residence a lowland, and the season hot and rainy. Dr. James Johnson makes a like distinction between the causes of the ordinary endemic fevers of the East. “The fever in question,” says he (bilious remittent), “frequently arises from atmospheric heat, or rather atmospheric vicissitudes, deranging the functions or even structure of important organs; and is, as Sir James M’Grigor supposes, sympathetic of local affection. Where marsh miasm is added, which is generally the case, then we have the endemic of the place, modified by the peculiar nature of the effluvia, and

GEN. III.

SPEC. II.

α E. malignus autumnalis.

and occasionally gastric or enteric inflammation.

The frame weakened often by the vicissitudes of the season.

Marsh miasm often the remote cause.

In the East as well as in Europe.

* The frequency of increased vascularity and ulceration of the mucous coat of the intestines in fever, has been amply proved by dissection. See particularly Broussais Phlegm. Chroniques; Andral's Clinique Médicale, tom. i.; and Bright's Reports of Med. Cases, p. 178. et seq. 4to. Lond. 1827. — Ed.

† On the Bilious Remittent of the Mediterranean. * The occurrence of remittent and intermittent fevers in ships, far distant from marshy countries, may appear at first to furnish an argument against the doctrine of malaria, or marsh miasm, being always concerned in the production of such disorders; but those writers who maintain the truth of the latter view would remind their opponents of the malaria frequently issuing from the bilge-water, in which the decomposition of vegetable-substances is going on. — Ed.

GEN. III.
SPEC. II.
α E. malignus
autumnalis.

from which we are not secured but by local habituation to the cause." *

In consequence, the symptoms have often a close resemblance in both cases, so much so indeed, that when both diseases co-exist, it is sometimes found difficult to distinguish them. "The occurrences," says Dr. O'Halloran, "which preceded the appearance of the epidemic of Barcelona in 1821, correspond with the old and recent observations on a similar subject in other countries; it almost invariably happening, that the YELLOW FEVER of Spain is preceded by unusual diseases of various form and force; more particularly by BILIOUS REMITTENTS, which are not unfrequently so aggravated and MALIGNANT, that physicians themselves do not venture to define the lines of demarcation between them and the avowed epidemic." †

Difficulties in explaining the nature of remittents, yet not greater than in other parts of physical study.
Remark of Sydenham.

There is still, however, a difficulty in determining why the type of any fever, hereby produced, should be remittent rather than intermittent or continued; and why its declinations should imitate one form of intermittents rather than another. Pathology has its mysteries as well as every other branch of science; and let the man who would accuse us of ignorance, because we are incapable of explaining these secrets of nature, first tell us, to adopt the language of Sydenham, "why a horse reaches his full growth at seven years old, and a man at twenty-one? or, why some plants flower in May, and others in June? If," continues he, "the most learned men are not ashamed to make an open avowal of their ignorance upon these points, I cannot acknowledge myself blameable if I modestly forbear reasoning upon a subject quite as difficult, and perhaps altogether inexplicable. At the same time I am persuaded, that the progress of nature is as certain and regular in these cases as in any others, and that the quartan and tertian intermittents are as subject to the natural laws, and as much governed by them, as any other occurrences whatever."

Diagnostics.

The autumnal remittent commences with lassitude, a general soreness over the body, yawning, inquietude, and most of the other concomitants of a febrile incursion. As some of the larger organs have been more affected by the influence of the season than the rest, we find them giving way in proportion. Hence, the head is sometimes severely tried with pain or heaviness; the bowels are overloaded with bile, or the stomach is exquisitely irritable, and rejects whatever is introduced into it. Generally speaking, the stomach, from this symptom, suffers more than any other organ; and, along with the sickness, we have often a very troublesome and debilitating looseness, which resists every attempt to check its course. Sometimes, however, the bowels are costive from torpor, and the stomach is but little affected.

Violence of incursion and duration of the fever not necessarily in proportion.

The violence of the symptoms is commonly in proportion to the violence of the incursion; but not the duration of the disease: for I have often seen a fever, that commenced mildly and insidiously, hold on for upwards of three weeks; whilst another, that commenced with great severity, and threatened the utmost danger, has softened its aspect in a week, and entirely quitted the patient

* Influence of Tropical Climates, &c. 3d edit. p. 105.

† Remarks on the Yellow Fever of the South and East Coasts of Spain, &c. 8vo. 1823.

in a fortnight. The exacerbation ordinarily takes place at noon, or early in the afternoon, and consists in an increase of heat and pulsation, for there is rarely any preceding chill, and as rarely any salutary moisture when the heat diminishes. The early part of the night is hence peculiarly restless, and no part of it tranquil: the patient dozes perhaps for a few minutes, but without being sensible of sleep, and talks incoherently while dozing; the images before him being partly furnished from dreaming and partly from delirium. And even during these snatches of unquiet slumber, he is perpetually turning from side to side in quest of ease, which no position affords him. Every symptom is obstinate; laudanum rarely produces sleep, and no sudorific, perspiration; the coolest and most refreshing drink is rejected from the stomach; and if looseness teaze the bowels, it is retained, as already observed, with great difficulty. It is hence of little importance what nourishment is offered, and every preparation seems almost equally to fail in supporting the strength of the system. In effect, the debility increases with every fresh exacerbation; and, if no favourable change take place before the fourteenth or fifteenth day, there will always be reason for alarm. The progress of this disease is admirably described by Professor Frank, under the name of *febris continua gastrica**, the remittent form being with him, as with Dr. Cullen, a section of the continued fever.

GEN. III.
SPEC. I.
α *E. malignus autumnalis.*

Continued
gastric fever
of Frank.

In the case of a young lady in her seventeenth year, whom I lately attended, the attack was slight, and no serious evil was at first apprehended. The pulse was about ninety in a minute, and rather small; the bowels were relaxed, the motions bilious, and the stomach suffered from nausea. A gentle emetic seemed to afford some relief to the stomach, and a dose of rhubarb and calomel to the bowels; but the fever continued, with a daily and increasing exacerbation, for the most part at mid-day or soon after. The stomach again became irritable and sick, and the sickness was again connected with a diarrhœa, but the stools were colourless and watery, and nothing was rejected from the stomach but the diluent food that was swallowed. The skin was now very hot and dry, the pulse from a hundred to a hundred and twenty strokes in a minute, the nights were passed in perpetual jactitation, or in short and talkative dozings. Opium, rhubarb, neutral salts, diaphoretics, and mild astringents, in almost every form and combination, were tried with very doubtful advantage, and the first with evident mischief. Anodyne injections were of as little avail; but sponging the limbs with cold water, or brandy and water, which was employed as well during the remissive as the aggravated symptoms, diminished the pungent heat, and for a time afforded some refreshment. Still the fever continued its career; the stomach retained nourishment with difficulty; the bowels were daily teazed with six or seven watery evacuations; the pulse was quicker and weaker, and the nights without rest. The heart at length became oppressed with a sense of fulness rather than of throbbing; the lips were considerably swollen, ragged and black; a hemorrhage occasionally issued from the nostrils and the fauces; and the general debility was greatly augmented. Such was the appearance towards the eleventh day.

Illustrated by
a case of great
severity.

* De Cur. Morb. Hom. Epit., tom. i. § 100. 8vo. Mannh. 1792.

GEN. III.
SPEC. II.
α E. malignus
autumnalis.

The tongue was not much furred; the pulse, though small, and rarely under a hundred and twelve, was steady; but the heat was intense, and the thirst unquenchable. The mineral acids in dilution, sometimes singly, and sometimes in the combined form of aqua regia, with acidulated beverages, were now chiefly trusted to, in connection with farinaceous foods, jellies, and beef tea; and cold water was permitted in any quantity. This plan was continued till about the eighteenth day; when every thing allowed being rejected, and every evacuation accompanied with faintness, it appeared to me that the plan should be changed; that the chief cause of irritation was at this time debility; and that a more stimulant treatment should immediately be commenced. My colleagues, for whom I have a high respect, acceded with reluctance, as conceiving that we should only exasperate the febrile symptoms; and that, if the stomach could not retain tasteless things, it would instantly reject wine, or convert it into an acid. The attempt, however, was made; sound old Madeira was administered by teaspoonfuls, and shortly afterwards a small portion of chicken-jelly. Both remained on the stomach; but the diarrhœa continued; and for this, as modern preparations had proved of little use, I recommended a scruple of the confectio Damocratis in half an ounce of cinnamon water after every loose motion. The diarrhœa ceased as by a charm; the ensuing exacerbation was less marked; the night was passed more tranquilly, and columbo, in small doses of the powder, was commenced the next morning, and persevered in. The change of treatment, being thus found to succeed, was adhered to, and the patient slowly, but effectually recovered.

General
treatment.

Emetics, when
little or no
sickness.

Aperients,
whether useful
or not.

Venesection,
when useful.

It is not often that the autumnal remittent is thus obstinate. But, whether there be sickness or not, an emetic should be administered, as one of the best means of determining towards the skin. And, singular as the advice may appear, it is rather to be recommended where there is little or no sickness than where the sickness is incessant; for, in this last case, the stomach is often so extremely irritable that emetics only exasperate it, and add to the distress. It will also be useful to evacuate the bowels on all occasions, though the emetic alone will frequently be sufficient for this purpose, and hence Stoll allows of nothing beyond: for purging, says he, augments the fever, while an emetic strangles it as at a blow.*

The use of the lancet must depend upon the circumstances of the particular case. Where the onset is violent, and particularly where the patient is plethoric or of a vigorous habit, it should be employed instantly and freely; for, without it, from the urgency of the symptoms, there can be little doubt that some large organ or other will soon become locally affected with effusion or congestion, which is always to be avoided as one of the worst symptoms that can occur. And, if we have reason to believe that such local affection exists at the time of the attack, and, more especially, that it is the cause of it, copious depletion will be still more necessary; for, in this case, we have not only to contend with the fever, but to guard against phlogosis or inflammation in the infarcted organ.

* Rat. Med., part i. p. 227.

But, except in such cases, there is no call for the lancet, and we may concede to Stoll that its use is injurious. [According to the observations of Dr. Bright, a tongue with red edges, more particularly when dry, almost universally indicates in fever great irritation of the mucous membrane of the intestines; and, when combined with loose, yellow, gritty dejections, generally denotes ulceration, or a state approaching to it. In this state, leeches and blisters may be applied to the abdomen; and the medicine in which Dr. Bright seems to put most faith consists of small doses of ipecacuanha, the hydrargyrum cum cretâ, and pulv. cretæ comp., generally in the proportion of a grain of the first, three of the second, and ten of the last article. The oleum ricini, with a few drops of tinct. opii, he prefers as the safest aperient. Two grains of hydrarg. c cretâ, and ten of confect. opii, made into pills, and to be taken thrice a day, are also sometimes prescribed, with mucilaginous saline medicines and ten or fifteen drops of vinum ipecac. to each dose.*] Copious diluents, and small doses of antimonial powder in effervescing neutral draughts, will ordinarily take off the burning heat of the skin by exciting a breathing moisture; and, if this can be maintained through the day, the ensuing exacerbation will probably be mitigated in its violence. If not, eight or ten drops of the tincture of digitalis should be added to the antimonial draught, and all tendency to sickness be restrained by a few drops of laudanum; keeping the bowels in the mean time open with some gentle laxative, as rhubarb and the sulphate or supersulphate of potash in combination. Blisters are never of service, except when topically called for, or as stimulants in the last stage of debility. If the diaphoretic plan fail of effect, and the heat be pungent and augmentive, acids, vegetable, mineral, or both, will ordinarily constitute the best sedatives and refrigerants; and, where the debility is extreme, the stimulant plan should be had recourse to, which is laid down in the preceding case.

GEN. III.
SPEC. II.
 α E. malignus autumnalis.
When injurious.
Treatment, when ulceration of the mucous membrane of the intestines is suspected.

Other remedies.

Blisters rarely serviceable.

Acids.

β E. malignus flavus.

Distinctive features.

Common remote cause, marsh miasm.

One of the severest and most fatal forms under which the malignant remittent shows itself is that of the YELLOW FEVER, constituting the SECOND VARIETY of the present species; so denominated from the lemon or orange hue which is thrown over the entire surface of the body, almost from the first attack of the disease, and which gives it a distinctive feature. The heat is here also intense, the thirst extreme, and the vomiting strikingly obstinate, but not, as in the preceding species, consisting of a colourless material, or the food that has been swallowed, but of a yellowish matter at the beginning and through the height of the fever, and of a chocolate-coloured colluvies towards its close.

The common remote cause of this fever is, unquestionably, marsh miasm; and hence it holds a stationary abode in the swampy soils and morasses of the intertropical regions, exposed to a high solar heat, and perpetually exhaling a decomposition of animal and vegetable materials: and is found occasionally in all climates that make an approach to the same character; where, in the correct picture of the poet,—

* See Bright's Reports of Medical Cases, p. 178, &c. 4to. Lond. 1827.

GEN. III.

SPEC. II.

β E. malignus
flavus.Yellow fever in
its malignant
form of recent
origin.

The rivers die into offensive pools,
And, charged with putrid verdure, breathe a gross
And mortal nuisance into all the air.

It is nevertheless a striking fact that, although such "mortal nuisances" have been exhaled into the atmosphere in all ages within the range of the tropics, the fever we are now entering upon is only of modern date in its malignant form. Whether this be owing to any degree of general change that has taken place in the human constitution, or to a larger accumulation of that mixed animal and vegetable compost which forms the hotbed of the present destructive miasm, or to any other cause, it is difficult to determine. It certainly seems, as Sir Gilbert Blane has observed, to have some bearing upon the slave-trade, with which it is precisely coetaneous. Small-pox, syphilis, and rickets, were equally unknown to the ancients; yet the causes of their origin, as, indeed, those of all other epidemic or constitutional diseases, are involved in inscrutable darkness; and, in the language of the poet,

— Noctescunt tenebris caliginis atræ.

History of its
rise and range;
visits America;

visits Europe;

visits Europe
afresh.Atmosphere
of its miasm.

The yellow fever first showed itself, so far as we have any record of its origin, at Barbadoes in 1647, whence it spread to various other West Indian islands, and at length made its appearance at Boston in North America, in 1693, to which place it was carried from Martinique by the fleet under Admiral Wheeler. In Europe, its earliest footsteps were traced at Lisbon in 1723*: after this period, it seems to have declined as well in its violence, as in its visits, to the same regions, particularly in respect to North America and Europe. But, in 1793, a new era of its prevalence commenced; the disease showing itself then and down to the present day with a frequency and fatality it had never evinced before, especially in the West Indies and North America. This aggravated form, however, did not manifest itself in Europe till the year 1800, when, after an interval of six-and-thirty years, it appeared at Cadiz in all its horrors. Since this period, it has visited Cadiz several times, and has hence spread to neighbouring seaport towns in the south of Spain, at short intervals. Among other places in this line of coast, it has repeatedly visited Gibraltar, first in 1804, when more than one third of the garrison and population were carried off; and occasionally since, but with little comparative loss, on account of those precautionary means which had been entirely neglected on the first visitation.

To what extent the miasm of yellow fever, as it arises from its swampy and putrescent base, may spread, before it becomes dissolved and decomposed in the surrounding atmosphere, it is not easy to determine. "It is probable, however, that, where a trade-wind or monsoon sets over a large tract fraught with febrific miasmata, these invisible agents may be carried to a much greater extent than where calms or gentle sea and land breezes prevail. This is exemplified in the fever of Corimbatores, and ought ever to be borne in mind by navigators in anchoring ships in the vicinity of swamps, or by generals in pitching tents or stationing troops."†

* Sir Gilbert Blane, Select Dissertations, &c. p. 284. Lond. 8vo. 1822.

† Influence of Tropical Climates, &c. by J. Johnson, M.D. 3d ed. p. 148.

It is also satisfactorily proved, that the modification of miasm producing yellow fever does not spread so far, or rise so high, and, consequently, is not so volatile, as that producing the ordinary bilious remittent of hot climates; a feature by which it makes a nearer approach to the miasm of human effluvium, and shows that affinity to it, even from the first, which we have endeavoured to establish in the introductory remarks to the present order. Dr. Ferguson has given us a striking illustration of the truth of this remark, as also of the relative barometrical elevations of the respective regions of yellow fever, ordinary bilious remittent, and a pure and healthy atmosphere, in the following passage, in which he is taking a medical periscope of the island of Antigua. "The autumn of 1816 became very sickly, and YELLOW FEVER broke out in all its low marshy quarters, while the Milder Remittent pervaded the island generally. It was the office of the white troops to take the guards and duties of the dock-yards amongst the marshes below; and so pestiferous was their atmosphere, that it often occurred to a *well-seasoned soldier* mounting the night-guard in perfect health to be seized with furious delirium while standing sentry, and, when carried to his barracks on Monk's Hill, to expire, in all the horrors of the black vomit, within less than thirty hours from the first attack; but, during all this, not a single case of yellow fever, nor fever of any kind, occurred to the inhabitants of Monk's Hill (a rock rising perpendicularly above the marshes to the height of six hundred feet). The result on the ridge (a hill about a hundred feet lower) was not quite the same, but it was equally curious and instructive. The artillery soldiers, seventeen in number, never took any of the night-guards, but they occupied a barrack about three hundred feet above the marshes, not perpendicularly above them, like Monk's Hill, but a little retired. Not a case of yellow fever or black vomit occurred amongst them; but every man, without a single exception, suffered an attack of the ordinary remittent, of which one of them died: and, at the barrack on the top of the ridge, at the height of five hundred feet, and still further retired from the marshes, there scarcely occurred any fever worthy of notice."*

GEN. III.

SPEC. II.

β E. malignus
flavus.Like the miasm
of human
effluvium, less
volatile than
the miasm of
the ordinary
bilious remit-
tent.Illustrated
from Ferguson.Like the same,
equally attaches
itself to neigh-
bouring sub-
stances.

Illustrated.

There is another feature, in which the miasm of the yellow fever shows its affinity to the febrile contagion of the human frame, and evinces its less diffusibility; and that is, in readily attaching itself to whatever bodies it meets with, though to some more than others. Even the leaves and branches of trees form powerful points of attraction, and, where they are in the immediate vicinity of a swamp, retain the contagious matter that rests upon them so effectually, as, in many cases, to keep the surrounding atmosphere free from pollution, and become a safeguard against febrile attack. "The town of New Amsterdam, in Be'bice," says the same writer, "is situated within a short musket-shot to a leeward of a most offensive swamp, in the direct tract of a strong trade-wind that blows night and day, and pollutes even the sleeping apartments of the inhabitants with the stench of the marshes; yet it brings no fevers, though every one is well aware that it would be almost certain death

* On the Nature and History of Marsh Poison, Medico-Chirurg. Rev., Dec. 1821; and compare with Chisholm on Tropical Climates, p. 34.

GEN. III.

SPEC. II.

β E. malignus
flavus.

Known under
various names.

Febris gastrico-
nervosa of
Frank.

Exhibits great
diversity of
symptoms.

Accounted for.

Whether capa-
ble of originat-
ing from other
causes than
marsh miasm.
Such causes
enumerated.

for an European to sleep, or even to remain after night-fall, under the shade of the lofty trees that cover the marsh at so short a distance. All, too, are equally aware, that to cut down the trees would be a most dangerous operation in itself, and would certainly be productive of pestilence to the town.” *

As almost every territory in which the fever hereby produced has committed its ravages has given it a new name, it is as gorgeously arrayed with titles as the mightiest monarch of the East. From the depredations it has committed in the West Indies and on the American coast, it has been called the St. Domingo, Barbadoes, Jamaica, and American fever; and, from its fatal visitations on the Guinea coast and its adjoining islands, the Bulam fever. In British India, it is distinguished by the name of the jungle fever, the Hoogly fever, or endemic of Bengal; and, still further to the east, by that of mal de Siam. Nearer home, in the lowlands of Hungary, and along the south of Spain, it is called the Hungarian or the Andalusian pestilence. From its rapid attack on ships' crews that are fresh to its influence, the French denominate it *fièvre matelotte*, as the Spanish and Portuguese call it *fiebre amarilla*, and still more frequently *vomito prieto*, or black vomit, from the slaty or purplish and granular saburra thrown up from the stomach in the last stage of the disease; while, as its ordinary source is marsh lands, it has frequently been named *paludal fever*. Its more common name, however, in the present day, and for the reason already assigned, is yellow fever; and, when the attack upon new comers is slight, *seasoning*. It is the *febris gastrico-nervosa* of Professor Frank †, who justly regards it as an intense variety of the ordinary autumnal malignant of temperate climates, as already described under this name.

From its showing itself in so many parts of the world, and under circumstances so widely different, it is not to be wondered at, that it should often be accompanied with a considerable diversity of symptoms; and, consequently, that the paludal fever of one quarter should be regarded by many writers of considerable authority as essentially different from that of another. But an attentive perusal of the origin and laws of febrile miasm, as I have endeavoured to explain them, when treating of the remote cause of fever, will, I trust, be sufficient to account for all such local distinctions; and, if not to prove, at least to render it highly probable, that they depend “partly upon the state of the body at the time of attack, but chiefly upon some modification in the powers or qualities of the febrile miasm itself, by the varying proportions of the co-operative agents of moisture, heat, stagnant air, and other auxiliaries which have not yet been detected, in their relation to each other in different places and seasons.”

How far the yellow fever is capable of *origination* from any other cause than febrile miasm from marshy lands, or places subject to like decompositions and plays of chemical affinity, we cannot at present determine. Such places, however, are numerous, as damp unventilated stations, stagnant water, thick impervious jungles, and

* On the Nature and History of Marsh Poison, Medico-Chirurg. Rev., Dec. 1821; and compare with Chisholm on Tropical Climates, p. 34.

† De Cur. Morb. Hom. Epit., tom. i. § 103. 8vo. Mannh. 1792.

woods that arrest the miasm as it ascends; even high and arid hills after heat and rain; but, above all, a foul state of the hold on board ships, whatever be the cause of such impurity. "Ships," observes Dr. Chisholm, "containing wine in their holds in a state of decomposition, are generally extremely sickly, and the character of the prevalent disease is that of YELLOW REMITTENT FEVER. Several instances of this took place in Fort Royal Bay in the years 1797 and 1798; and the situation of the ships in the open bay, far from the influence of marsh effluvia, precluded a suspicion of the fever from that cause. The ship *Nancy*, Captain Needs, from Fayal, with a cargo of wine for the army, arrived at Fort Royal, Martinico, in the month of October, 1798: she met with a gale of wind at sea on the 17th September, and several of the casks, from the motion of the ship, became leaky. The captain was taken sick at sea, and died with every symptom of the highest grade of yellow remittent fever. The mate and several of the crew were attacked with the same complaint: they recovered; but a mate, shipped at Fort Royal, fell ill on board and died. The ship lay out in the open bay; no vessel near her was sickly; and she herself became very healthy after the cargo was landed."*

Heat alone, however high the temperature, is not a cause of the fever before us: there must be moisture; and, as the result of both, a rapid decomposition and exhalation of organic remains. Provided the air is dry, even tropical climates are often found salubrious. "The burning province of Cumana," observes M. Humboldt, "the coast of Cora, and the plains of Caraccas prove, that excessive heat alone is not unfavourable to human life."

It has just been observed, however, that even high and arid situations, after heat and rain, may also furnish, by the chemical decomposition of their soil, the specific miasm of yellow fever: and it may here be added, that if, by the violence and redundancy of the rain, the swampy low grounds be at the same time overflowed, the latter will become an arena of health, while the heights are the seat of disease. Such the hilly ravines of Portugal were occasionally found by the British army, during its occupation of that country in the summer of 1809, when a most destructive remittent suddenly made its appearance, while the overflowed swamps at its feet were more than usually free from disease: "and such is frequently the case," as Mr. Irvine has justly observed, "on the lofty ridges of Sicily, when their fumari or water-courses, which are ordinarily dry and used for roads in the summer months, are filled and inundated with sudden torrents of rain. For here the malaria changes its station, and quits the overflowed lowlands for the heights of the primitive hills."†

But, whatever be the original source of the fever before us, when once it has established itself and rages with severity, it is now very

GEN. III.
SPEC. II.
β *E. malignus*
flavus.

Heat alone not
a cause.

But heat, even
on high grounds,
may become a
powerful aux-
iliary, other
causes being
present.

* Essay on the Malignant Pestilential Fever, vol. i. p. 279. See also Dr. Dickson's Topographical Remarks, &c. sect. iii.

† These facts confirm the observations introduced in a previous part of this work, in explanation of the occasional prevalence of agues in elevated parts of the country, or even on hills, while lower situations continue healthy. They also tend to refute the opinion of the identity or affinity of marsh miasm and of contagion from human effluvia to one another, inasmuch as one argument frequently adopted in favour of the latter hypothesis, is founded upon seeming anomalies in the circumstances under which agues commence. — Ed.

GEN. III.

SPEC. II.

β E. malignus
flavus.

Secondarily
produced, and
communicable
by contagion.
Sometimes per-
haps primarily
thus produced.

generally admitted that the effluvium from the body of the affected "is loaded with miasm of the same kind, completely elaborated as it passes off," — and that the disorder is from this time capable of communicating itself by contagion. And, from the statement already given, it appears far more probable, that the fever at Cadiz in 1800, that at Malaga in 1803, and that at both in 1820, had their *origin* in contagion, or, in other words, in febrile miasm, produced by a decomposition of the effluvium from the human body, than from the same miasm issuing from a decomposition of marsh-lands. And, on this account, I have rather preferred the trivial name of *yellow* to that of *paludal* fever, which is too limited to express its source in every instance. The yellow fever at Xeres is ascribed by Don J. A. Ferrari entirely to this cause, as produced by importation; but its primary source he attributes to the decomposition of swampy lands, or other sources of putrefaction, which he seems to suppose may exist even in some parts of Spain.*

In all instances it has a near approach to the autumnal remittent we have just described: Dr. Rush contemplates them as merely different degrees of the same disorder; but Dr. Bancroft is, as it appears to me, more correct in considering them, after Professor Frank, as "varieties of one disease†," in unison with the present arrangement.

Ascertain height
of temperature
necessary for
it to become
contagious.

It should be observed, however, that, for the yellow fever to become contagious, it seems necessary that the thermometer should be above 80° of Fahrenheit: since, like the plague, it demands, for the activity of its miasmatic corpuscles, a certain range of temperature, below which it ceases to operate, and its specific particles, perhaps, generally become decomposed. It has never been known in North America, nor in the South of Europe but at the season of the year in which tropical heats, that is, those of 80° or upwards, prevail; and it has never failed to disappear in winter, even in the mild winter of Spain: though typhus may at the same time hold its full career of malignity.‡

* Edin. Med. and Surg. Journ., July, 1823, p. 369.

† Essay on the Disease called Yellow Fever, &c. 1811.

‡ Blane, Select Dissertations, &c. p. 314. Is not this a strong fact against the contagious nature of yellow fever? The proof of the extension of the disorder by the contagion of human effluvia must be exceedingly difficult, as long as the parties who are imagined to contract the fever from those first affected, are exposed to the influence of the same local circumstances. The notion of intermittent and remittent fevers being capable of transmission from one person to another by contagion, is, in all probability, as erroneous as the belief, prevalent in Italy, Malta, and other parts of the south of Europe, that consumption is a contagious disorder. When I was at Malta in 1801, I wished to procure a lodging for an officer labouring under phthisis, but, owing to the belief universally entertained in that island of the disease being contagious, it was with great difficulty that any family could be persuaded to afford him accommodation. With regard to the malignant remittent fevers, so often prevalent on the coast of Spain, it is a fact that, although the commissioners sent by the French government to investigate the character of the fatal disorder which, in 1821, raged in the city of Barcelona, reported, that it was propagated by infection, the doctrine never gained much belief in France, because it was considered to be sufficiently refuted by other views taken of the same epidemic by Dr. Chervin, whose able researches fully established the fact, that the propagation of the fever was chiefly, if not entirely owing to the malaria of the place in which it prevailed, and not to emanations from those affected by it. — Ed.

From the different impressions produced on febrile miasm under these diversities of origin and adjuncts, we find, independently of other discrepancies, that the fever it excites sometimes assumes a caumatic or inflammatory cast, sometimes a typhous, and sometimes a synchous, or, in other words, begins with the first and runs rapidly into the second or third. And it is in effect into these three subsections that the Andalusian yellow fever has been lately restored by Dr. Jackson, in his excellent work on the subject. Generally speaking, the variety before us evinces the last of these characters, as does also the variety we have just treated of: the two varieties that yet remain, will afford examples of a typhous and inflammatory bearing.*

Its ordinary progress, amongst those who are fresh to the tainted atmosphere, is thus accurately described by Dr. Mosely, who, from its resemblance to the *causus* of Hippocrates, denominates it *endemic calcaus*: a term which has since been adopted by Dr. M'Arthur†, and several others. "When a new-comer is seized with a sudden loss of strength, and a desire of changing, for rest, into every position, without finding it in any, those symptoms which constitute the *endemic calcaus* may be expected. The following day, but sometimes within twelve hours from the first indisposition, the violence of the disease will commence thus:—There will be a faintness, and generally a giddiness of the head, with a small degree of chilliness and horror, but never a rigor. Then immediately will succeed a high degree of fever, with great heat, and strong beating in all the arteries of the body, particularly observable in the carotid and temporal arteries; flushings in the face; gaspings for cool air; white tongue, but tinged with yellow, after the retchings have commenced; excessive thirst, redness, heaviness, and burning in the eyes; heaviness and darting pains in the head and small of the back, and often down the thighs; pulse quick, generally full and strong, in some cases, quick, low, and vacillating; skin hot and dry; sometimes with a partial and momentary moisture; sickness of the stomach from the first, which increases with the disease; and, immediately after any thing is taken to quench the thirst, retchings succeed, in which bilious matter is brought up; anxiety, with stricture, soreness, and intense heat about the *præcordia*; great restlessness; heavy respiration, sighing; urine deep-coloured, and but little in quantity. This is the first stage of the fever, and may continue twenty-four, thirty-six, forty-eight, or sixty hours, and this constitutes its inflammatory period.

"The second stage begins with an abatement of many of the

GEN. III.
SPEC. II.
β E. malignus
flavus.
Remittent fever
from incidents
evinces differ-
ent forms.
Yellow fever
generally the
synchous.

Ordinary
progress.

First stage.

Second stage.

* Here it ought to be noticed, that the contagious nature of typhoid fevers is a disputed point. If you allow the effluvia from too many human beings crowded together in a badly ventilated building, to be, as it were, concentrated, you will see fever arise; but for typhus to be communicated to another person from a patient lying in an airy apartment, is a circumstance, at all events, so rare, as to be a matter of doubt. Whether the patients, crowded together, have one fever or another, or at first no fever at all, febrile disorders, with change of type if they have previously existed, will generally come on. The inflammations and alterations of the mucous intestinal tissues, and other parts, arising in the course of intermittent and remittent fevers, together with the influence of medical treatment, will also frequently account for change of type. — En.

† Account of the *Causus* or Yellow Fever of the West Indies, &c.

GEN. III.
SPEC. II.
β E. malignus
flavus.

preceding symptoms, and the rise of others; sometimes with a deceiving tranquillity, but with perturbation if the patient should fall into a sleep: then a yellow tinge is observed in the eyes, neck, and breast; the heat subsides, and sometimes with a chilliness, but not with that sort of strong rigor which, when it happens, terminates the disease by sweat, or by copious bilious evacuations upwards or downwards. The retchings are violent, and turn porraceous; the pulse flags, but is sometimes high and sometimes soft; the skin soft and clammy; the urine in small quantity, and of a dark croceous colour; the tongue in some cases is dry, harsh, and discoloured, in others furred and moist; there is confusion in the head, and sometimes delirium, with the eyes glassy. This stage of the disease sometimes continues only for a few hours, sometimes for twelve, twenty-four, thirty-six, or forty-eight hours, but never longer.

Third stage.

“ In the third and last stage of the fever, the pulse sinks, and becomes unequal and intermittent, sometimes very quick; frequent vomiting, with great straining and noise, and what is brought up now is more in quantity, and has the appearance of the grounds of coffee, or is of a slate colour. Nothing can be retained in the stomach; difficult breathing; tongue black; cold clammy sweats; eyes hollow and sunk; yellowness round the mouth and temples, and, soon after, over the whole body.”

Closing scene.

In the earlier remissions, the pulse often sinks from a hundred and thirty to ninety, and the general improvement is so considerable as to impress the young practitioner with the belief of a salutary crisis. He is soon, however, aroused from his deception, for the exacerbation soon returns with renewed violence; and, as the symptoms grow more aggravated, they are, in the end, accompanied with subsultus tendinum, black urine, deadly coldness of the limbs, delirium, faltering speech, hemorrhage, or oozing of blood from the mouth and nostrils, corners of the eyes and ears; black bloody vomiting and stools; vibices, hiccough, muttering, coma, death.

General
remarks.

After the first prostration of strength produced by the symptoms of invasion or accession, the *prodromes* of M. Deveze, the disease runs on violently through its stage of excitement till the sensorial power is exhausted. Through its entire course, till the patient is sinking, the intellect is not particularly disturbed, and the organs chiefly affected are the abdominal; those, which principally suffer in the malignant autumnal remittent of our own country, are especially the stomach and the liver. Hence, the intense heat and anxiety about the præcordia, the saffron dye of the urine, the yellow tint of the skin, and the vomitings, first of a bilious, and afterwards of a chocolate or sanguineous colluvies. In the Andalusian variety, however, according to Dr. Jackson, the brain is sometimes the first organ affected, and the abdominal organs consecutively.*

Rapid rush to
the second and
third stages in
some cases.

In some cases, the disease opens with great vehemence, and rushes forward at once to its acme, constituting the second stage of Dr. Mosely. The patient is sometimes cut off in four and twenty hours: and, from the violence so suddenly committed on the liver, its proper function is instantaneously suspended, and,

* Remarks on the Epidemic Yellow Fever, &c. on the south coast of Spain. 8vo. Lond. 1821.

instead of an excessive emulgence of high-tinted bile, a chlorotic secretion takes place, which, forced into the sanguineous system, gives a ghastly lividity to the entire surface. Shortly after which, if the patient live long enough, the gorged blood-vessels of the inflamed and gangrenous liver itself, and sometimes also of the spleen or stomach*, give way, and repeated tides of dark, granulated grume, like the grounds of chocolate, are ejected by the mouth.

Dr. Pym has very forcibly described this overwhelming onset of the disease in the following terms:—"There is, *at the first attack*, a peculiar shining or drunken appearance in the eyes; the headach is excruciating, and confined to the orbits and the forehead; has no remissions; when it terminates favourably, is rarely attended with yellowness of the skin, which, if it do take place, is of a very pale lemon colour. It runs its course from one to five days, is attended with a peculiar inflammation of the stomach, which, in most cases that prove fatal, terminates in gangrene, or in a diseased state of the internal or villous coat of that organ, accompanied with a vomiting of matter resembling coffee-grounds, and a livid or putrid appearance of the countenance which it is impossible to describe; but those, wishing to form an idea of it, may see its facsimile in the countenance of any person with a florid complexion, during the burning of spirit of wine and salt in a dark room, as is practised in the game of snapdragon during the Christmas gambols." †

In this state, the disease is unquestionably for the most part, though not always, contagious: and, as Dr. Cullen has laid down contagion as a distinctive character of fevers originating from human effluvium, in contrast with those originating from the effluvium of marshes, Dr. Pym has endeavoured to draw a line of distinction between yellow fever in this state of intensity and in its ordinary career; contending that the former (to which he limits the name of Bulam fever) is in every instance derived from human effluvium, and, consequently, that the two must of necessity be distinct diseases. And to make the distinction still clearer, he has ventured to assert, that the symptom of a more pallid or bloated countenance, together with that of black vomit, or the discharge of coffee-like grounds from the stomach, is peculiar to the contagious fever, and is rarely if ever an attendant on that produced by marsh miasm even in its most impetuous and fatal course.

This distinction, however, is in both instances at variance with the history of the disease as it has occurred in most other parts of the world, and, more especially, with respect to the symptom of black vomit; which, in its last stage or severer incursions, is common to it from whatever source derived. Nothing is more frequent in the Andalusian or Spanish variety, where the discharge is sometimes inky-black, like the fluid disgorged by the cuttle-fish; and it is thrown forth from the anus as well as the stomach. ‡ Black vomit occurred more especially in the fatal epidemic of Anti-

GEN. III.
SPEC. II.
β E. malignus
flavus.
Black vomit.

Description of
the disease in
its rapid march;
by Pym, called
Bulam fever.

In this state
unquestionably
contagious, and
hence supposed
to be distinct
from yellow
fever.

But this sup-
position at
variance with
the disease, as
it has appeared
in different
places.

* Chisholm, Manual of the Climate and Diseases of Tropical Countries, &c. p. 36.

† Observations upon the Bulam Fever, &c. 8vo. 1815.

‡ Remarks on the Epidemic Yellow Fever, &c. on the South Coast of Spain, &c. By R. Jackson, M.D. Lond. 8vo. 1821.

GEN. III.

SPEC. II.

β E. malignus
flavus.

Yellow fever at
Antigua, as de-
scribed by
Musgrave.

All the varieties
exhibited in
this epidemic.

As also at
Mariegalante.

The Bulam and
Antigua fever
compared and
identified.

gua in 1816, which was decidedly an offspring of marsh effluvium. "The island had for some years," observes Dr. Musgrave *, at whose description we have already glanced slightly, "been peculiarly healthy; and the disease first showed itself in a swampy part of it, and amidst new-comers who were sailors, but from a healthy ship, and themselves in good health on first landing. It soon spread widely, and at length indiscriminately among all ranks, and conditions, and situations; among blacks and whites, the newly-arrived and the oldest settlers in town and country."

Nothing was better calculated than this fever, to show that almost all the different kinds of fever that occur to us are capable of issuing from a common source or miasm, merely modified by contingencies; for, in Antigua, they all occurred in different individuals. The disease sometimes *commenced* as an intermittent or remittent, and sometimes in a continued type: it sometimes ceased in four or five days, which was its usual course, and sometimes *terminated* in an intermittent. The head was in some cases chiefly affected; in others the stomach, liver, or some other organ: sometimes the patient died without hiccough or black vomit, though he rarely recovered where these symptoms appeared; Dr. Musgrave recollects but one instance. Recovery was no exemption against a second attack. In new-comers, the tint was of a lemon hue; in native or assimilated constitutions, of a deep orange. The state of the atmosphere at the commencement of the disease presented nothing peculiar.

To the same effect, Dr. Dickson, in his valuable official report:—"At Barbadoes and Antigua, I had generally seen the disease of an ardent and *continued* form, and did not fully understand why authors talked of a bilious *remittent* yellow fever, until after the capture of the French and Danish islands. But the anomalies of fever, the shades and changes which it assumes, according to the intensity of the exciting causes, the state of predisposition, or the spot of residence, could nowhere be more strongly portrayed, than in the destructive epidemic of Mariegalante in the autumn of 1808, from the most concentrated marsh miasmata; where the different types of fever were *CONVERTED* into each other, of the worst and most aggravated species I have ever witnessed. Yellow fever in the *continued form*; others with comatose *remittents* or *intermittents*; the exacerbations of which were so violent as to carry off a patient in two or three paroxysms; while others sunk into a low protracted character of fever, resembling *typhus*."†

In the midst, however, of so much discrepancy, there is still much that is concurrent, and quite enough to establish the identity of the two diseases, if an abundance of other evidence to the same purpose were not at hand. The fever of Dr. Pym, specifically characterised by black vomit, is represented as being peculiarly dangerous and fatal; in that of Dr. Musgrave, this symptom only occurred in the most perilous cases. According to the latter, the severest and most deadly attacks were amongst the new-comers; the mildest amongst the natives, or those whose constitutions were assimilated to the climate. The yellow hue of the former (and I have already endeavoured to account for this) was of a *deep orange*;

* Medico Chirurg. Trans., vol. ix. p. 92.

† Report, &c. pp. 143, 144.

that of the latter, a *lemon colour*. Dr. Pym describes three species of fever as common to warm climates, but which differ from each other in their mode of origin, and diagnostic character. In that of least danger, the colour of the surface, he tells us, is of "a *very deep yellow*"; in that of higher danger, it is of "a *deep yellow*;" and in the disease before us, which is by far the most fatal, where there is any yellow at all, it is of "a *very pale lemon colour*;" which is, in effect, the very hue ascribed to the severest cases of the Antigua fever by Dr. Musgrave, as the "very deep yellow," or "orange," is to the mildest. So that, examined by their external livery, as well as their internal disorganisation, there can be no doubt that the two diseases are the same. Dr. Pym appeals peculiarly, as a distinctive character of the Bulam fever, to the deadly and chlorotic paleness, exhibited by the countenance in its latest stage, or most fatal incursion. But even this only shows that, in such case, the disease makes a mortal attack upon the larger viscera, and especially the liver, from the first; and demonstrates the proposition I have ventured to lay down, that, in proportion as this organ is severely affected, is its inability to secrete proper bile, or indeed bile of any kind; and, consequently, that if the irritation only reach a certain point, its secernents will be stimulated to emulge a larger quantity and of a deeper hue; a considerable portion of which will be absorbed into the sanguiferous system, and produce the orange tinge, which, in the description of both these writers, peculiarly marks the disease before us in its less fatal attacks: while, if the febrile incursion be so violent as totally to derange the function, and still more the structure of the liver, no bile will be secreted at all, or, if secreted, less in quantity, and consequently less diffusive in colour; and hence only conveying a chlorotic or livid tinge to the face, which, at the same time, exhibits a bloated fulness from effusion or debility of vascular action.

In confirmation of this remark, Dr. Jackson's earlier cases of practice furnish numerous examples; — "examples indeed," to adopt his own words, "of that form of disease when there is a considerable degree of vascular excitement in the early stage, terminating commonly by deranging the functions of an organ of importance — most frequently the liver or stomach. Yellowness and black-vomiting are common; and it is *more especially* to this form, that the name of YELLOW FEVER has been applied: but though the yellowness and black-vomiting be common, they are *not constant* and essential. Determinations sometimes change suddenly; the brain becomes overwhelmed, and stupor and convulsion then cut short the ordinary rapid course.*

Yet, after all, it is not denied by Dr. Pym, nor, so far as I know, by any of the writers on the American or Andalusian fever, that the yellow fever from marsh miasm ever evinces either of the symptoms that are so essentially ascribed to the bilious remittent produced by contagion, but only that "it is rarely, if ever," to adopt Dr. Pym's own words, "attended with the fatal symptoms peculiar to the Bulam fever, viz. the black-vomiting, and a peculiar bloated appearance of countenance."

GEN. III.
SPEC. II.
β E. malignus
flavus

Confirmed by
Jackson.

Discrepancies
reconciled.

* Hist. and Cure of Fever, chap. iv. p. 133.

GEN. III.

SPEC. II.

β *E. malignus flavus.*

Chiefly dependent upon Cullen's hypothesis.

Bilious remittents produced from both marsh and human effluvium.

Evidenced in that of Philadelphia, 1793.

In the Minorca fever.

Report of Blane on the mortality in Ascension Island, 1823.

There would, however, be an almost insurmountable difficulty in reconciling these different descriptions of the same disease, in consequence of Dr. Musgrave's telling us, very decisively, that not a single instance occurred in the Antigua fever of its being received by contagion, were there not strong reason for believing, that this explicit writer suffered himself to be deceived upon this point; most probably, like Dr. Pym and Dr. Jackson, from too close an attachment to the doctrine laid down by Dr. Cullen, that the fever from marsh miasm does not produce contagion, which is specifically a result of a fever from human effluvium.

It is impossible to peruse the history of bilious remittents in warm climates, offered from all quarters, without seeing that it may originate from both sources; each sometimes operating alone and sometimes in conjunction with the other, as was probably the case at Antigua, and certainly the case in the yellow fever that raged at Philadelphia in 1793, in which, says Dr. Rush, there were, for several weeks, two sources of infection, viz. exhalation and contagion. The exhalation infected at the distance of three and four hundred yards, while the contagion infected only across the streets. The more narrow the streets, the more certainly the contagion infected. Few escaped it in alleys. After the twelfth of September, the atmosphere of every street in the city was loaded with contagion; and there were few citizens in apparent good health who did not exhibit some mark or other of it in their bodies, particularly a preternatural quickness in the pulse, "which occurred in negroes, as well as in a few who had the disease before."

In like manner, the Minorca fever, uniformly originating, as Dr. Boyd observes, in marsh miasm, frequently becomes contagious*: of which, indeed, he has furnished us with a striking example in his own person: for we are told by Dr. Denmark that he caught the fever from one of his patients, and nearly fell a victim to it.† But we have had occasion to examine this subject so much at length, in the introductory remarks to the present order, that it is unnecessary to pursue it further, except by introducing the following irresistible illustration:—

Sir Gilbert Blane, having been requested by the Board of Admiralty to examine into the dreadful mortality that took place at the island of Ascension, in the summer of the present year, 1823, reported, and from the manuscript of this report I was permitted to copy, that the officers and privates of Ascension Island were first stationed there in September, 1821, in number twenty-eight, and continued in such full health as to be without the loss of a man till the arrival of the Bann sloop of war, in May, 1823. The Bann had left Sierra Leone towards the close of the preceding March, at which time the yellow fever was raging there with great mortality, and, at the time of sailing, had had no sickness of any kind on board: but, within a few days after sailing, the yellow fever made its appearance, and continued its ravages till the beginning of June: during which time, not less than ninety-nine men had been attacked by it, and thirty-three cut off, out of a crew of one hundred and seven Europeans and officers, independently of

* De Febre Minorcæ, &c. 1817.

† Medico-Chirurg. Transact., vi. 301.

twenty-seven African supernumeraries, none of whom suffered from the disease. Upon the arrival of the Bann at the isle of Ascension, an unrestricted communication took place between the sick crew and the healthful garrison, the medical officers of the station having adopted the opinion that the yellow fever is uncontagious. For want of such restrictions, within a few days after the arrival of the Bann, the garrison became affected, now reduced from twenty-eight to twenty-two, in consequence of six men having been ordered to a distant part. And, such was the dreadful mortality with which the disease raged, that, out of this garrison of twenty-two officers and soldiers, not less than sixteen died, being rather more than three fourths of the whole. The medical officers were soon, though too late, convinced of their delusion, and most unreservedly admitted the quality of contagion; and that the disease they were called to contemplate was genuine yellow fever will be placed beyond a doubt by the two following symptoms, that the surgeon of the Bann particularly notices as among its other characters:—“the skin tinged with yellow, assuming a deeper and deeper hue;” and, “before death, the vomiting of a dark-coloured fluid, like coffee-grounds;” conjoint symptoms, which, as Sir Gilbert Blane observes, will apply to no other epidemic whatever.*

How far the tanks or pools of water within the range of the febrile miasm, from whichever of the two sources produced, may become sufficiently impregnated to propagate the disease, has not been sufficiently determined. The Tamul, or native practitioners on the Coromandel coast, ascribe the epidemic that so often ravages their country to contaminated water as well as to contaminated air, and the able authors of the report on the Corimbatores fever incline to adopt this opinion.

In France, where, consistently with the popular doctrine of M. Broussais, the disease is supposed to be seated in the mucous texture of the stomach or intestines, and to be dependent on contagion alone†, as its means of propagation, a considerable degree of fancy has of late been indulged in, respecting the origin of this contagion; and the fancy has been varied according to the bent of the individual. Thus, M. Moreau de Jonnés has endeavoured to show, in a work of some learning, but more imagination‡, that the yellow fever, however at first produced, which has eluded his researches, has been perpetuated among Europeans, in the manner of plague, leprosy, and syphilis, by a specific poison that has existed immemorially among the Indians of St. Domingo, and was commu-

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SPEC. II.
β E. malignus
flavus.

Whether water
in tanks may
be contami-
nated as well
as air.

Doctrine of
Broussais.

Moreau de
Jonnés.

* Future experience will decide, whether a fever, corresponding to that now adverted to, will ever arise in Ascension Island, except under circumstances similar to those stated by Sir Gilbert Blane. Fevers affecting the crew of a ship, however, may be looked upon as happening in a situation not the best adapted for ventilation, and where too many persons are congregated together; under these conditions, no doubt, any prevalent fever may become infectious. The state of the weather and atmosphere, and the localities, to whose influence the military were exposed in Ascension Island, about the period of their being taken ill, are particulars which should be studied in order to arrive at any very certain inference upon the subject. — ED.

† This doctrine is on the decline in France, as already noticed in a previous page. — ED.

‡ Monographie Historique et Médicale de la Fièvre Jaune des Antilles, &c.

GEN. III.

'SPEC. II.

β *E. malignus*
flavus.

nicated by them to the Spanish fleet, under the command of Columbus, in December, 1493, and from this fleet to all the world in succession, in consequence of the close intercourse, which took place between the individuals of the new settlement of Isabella, colonised out of the fleet, and the adjoining natives. In answer to which, however, it is sufficient to observe, after Dr. Chisholm*, that the Spanish writers, Herrera and Oviedo, appealed to in proof of this fact, rather unite in showing, that the Spanish settlers received the disease, in the first instance, from marsh miasm, and then communicated it to the natives themselves: while M. Adouard traces the same contagious poison to an effusion or exhalation from the mucous membrane of the stomach of the individual affected, produced by an engorged or congested state of its vessels, and which, in consequence of the gaseous elasticity of the material thus eliminated, escapes by eructation, and propagates itself by being swallowed, and thus communicated to the stomachs of others; on the mucous surface of which it commences a like action, and fructifies a like harvest of contagious matter; the black material which remains behind being, in his opinion, a mere *caput mortuum*, unendowed with any infectious or other mischievous property.†

Adouard.

Nature of
black vomit.

Innocuous.

There is much truth in this last position, whatever becomes of all the rest. Black vomit has been by many physicians, and was at one time supposed by Dr. Rush, to be vitiated and discoloured bile; but it is now more generally conceived to be, as already stated, grumous or granular blood, let loose from the liver, stomach, or some other digestive organ, from the violent commotion of the disease.‡ Dr. Bancroft affirms that "it is always insipid;" and we have numerous instances of orderlies in sick rooms, who have had their hands and faces covered with black vomit suddenly ejected from the stomach, which they have taken little pains to wash off, while others have slept in sheets or blankets stained and inundated with its flow, and yet have escaped the complaint. It marks, indeed, the violence of the disease, and is hence, commonly, though not always, accompanied with the formation of contagious miasm, but in itself it is not a source of contagion. The following instance of disgusting hardihood, though it has been brought forward in proof, not only of the innocuousness of black vomit, but of the uncontagious nature of yellow fever from any source, falls rather within the limit of an exceptive idiosyncrasy, in the escape with which it was accompanied, than lays any foundation for a general rule. A M. Guyon, of Fort Royal, Martinique, we are told in the *Revue Médicale*, had the bravery to wear, for twenty-four hours, the suit, drenched with sweat, of a soldier who had been labouring under this disease in its worst state; he suffered him-

Singular ex-
ample of insus-
ception of
contagious
miasm.

* Of the Climate and Diseases of Tropical Countries, &c.

† Relation Historique et Médicale de la Fièvre Jaune, qui a régnée en 1821, à Barcelone. 8vo. Paris, 1822.

‡ The effusion of blood into the cavity of the stomach or intestines, it is thought, may occasionally depend upon certain states of that fluid itself, by which it is so modified, that it tends every where to escape from the vessels. According to Andral, this is what happens in some examples of poisoning by absorption, and in typhus, and is the cause of the black vomit in yellow fever. See *Anat. Pathol.*, tom. ii. p. 151. — Ed.

self to be inoculated in both arms with the yellow matter issuing from suppurating blisters: he went into the bed of another patient, who had just died of the disease, while it was soiled with excrement; wore, at the same time, his shirt, soaked through with black sweat and still warm, and himself slept soundly, and sweated through a good part of six hours and a half, which he dedicated to this delectable trial; he exhibited several other feats of the same kind, and crowned the whole by drinking about two ounces of the black vomit discharged from the dead man's stomach—and, nevertheless, entirely escaped the fever. Admitting the truth of this marvellous story, there is still no great difficulty in conceiving that a man, who was so totally torpid to all delicacy of mental feeling, might, at the same time, labour under a like torpitude of corporeal feeling, and be insensible to various irritants that would be sure to affect others.*

It is probably owing to an idiosyncrasy, producing something of the same kind of insusceptibility to the action of the contagion of yellow fever, that, while the miasmatic poison for the most part takes place immediately, it sometimes continues dormant for an indeterminate period. Dr. Jackson has known it remain in this state for two months; and Dr. Bancroft for even nine or ten.

The individual, who has passed through the disease, is rarely attacked a second time. In the opinion of some physicians, he obtains hereby an immunity at least equal to that afforded by the small-pox.† The examples, however, of recurrence are too numerous to justify such a comparison; though, in most instances where the disease has returned, it has evinced a milder character. But this influence on the system, whatever it may amount to, seems to be lost by a short absence from tropical climates; so that those, who return to Europe for a few months, are as open to all the effects of a febrile incursion, as though they had never been within the tropics before.

As the larger viscera suffer very differently in different cases of this malady, the appearances on dissection have generally kept pace with the previous indications: for, in some, the integuments of the brain, or even its vessels, its substance, and its cavities have shown marks of inflammatory action, which have not been traced elsewhere; while in others, whose brain has appeared sound throughout, the stomach and its collatitious organs have been found chiefly affected with congestion, rupture, or, still more frequently, an erythematous inflammation, which, in some instances, has spread from the pylorus through nearly the entire range of the intestinal canal. In various other examinations, the chest has exhibited the chief seat of disorganisation; and in others again, the urinary organs.‡ The mucous membrane of the intestinal canal is by far

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β E. malignus
flavus.

Other exemplifications.

Disease rarely occurs a second time, without absence from the same climate, though sometimes it does, yet milder. Voyaging to a different climate restores the susceptibility.

Variable appearances on dissection.

* In the Med. Chir. Trans. of Edinb., vol. ii. Dr. Ralph has published the History of Yellow Fever, as it appeared in the queen's regiment in Barbadoes in 1816 and 1817. The facts, mentioned by him, in proof of the disease not being communicable from one person to another, are remarkably strong; indeed, such as leave scarcely any doubt on the subject, as far as the particular fever described by him was concerned. — Ed.

† Report of the Army Medical Board on Dr. Pym's Observations.

‡ Bally, sur la Typhie Amérique ou Fièvre Jaune. Paris, 8vo. — Palloni, Obs. Méd. sur la Fièvre régnante à Livourne, &c. — Saverésy, de la Fièvre Jaune en général, &c.

GEN. III.

SPEC. II.

β E. malignus
flavus.

the most frequently injured organ; and this has been laid hold of with no small degree of triumph by M. Broussais and his adherents, as affording a manifest proof of the truth of their favourite doctrine: and that yellow fever can be no other than *une* GASTRITE, or, in still later language, *une* GASTRO-ENTERITE. But it should not be forgotten, that most of the gastric symptoms, and all the severest ones, only occur in the course of the disease, and rarely in a very early part of it; and that they are hence rather to be regarded as effects of overwhelming febrile action upon the delicate and irritable texture of the membrane so severely excited, than as a proximate cause of the fever itself: and the more so, as sometimes the biliary system, the lungs, or the brain are chiefly affected, and the intestinal canal exhibits fewer proofs of suffering than any of these organs.

Remedial process unfortunately discrepant in different hands.

Unfortunately, the practitioners in warm climates have differed as much in their therapia as in their etiology; for the latter, as might be expected, has greatly influenced the former. Dr. Lind, Dr. Clark, and Dr. Balfour, whose authorities were implicitly allowed and submitted to, some fifteen or twenty years since, alarmed at the debility which the system will have to encounter in the second stage of the disease, or as soon as it has run through its inflammatory career, shuddered at the thought of the lancet, and generally commenced with clearing the stomach and intestinal tube by gentle emetics or purgatives, or both, and immediately had recourse to the bark in as large doses as the patient's stomach could bear, paying little or no regard to the remissions or exacerbations of the fever: though the last of these physicians chose calomel as his cathartic, and alternated its exhibition with the bark till the disease was subdued, or had effected its own triumph; at the same time allowing a free use of opium to keep the bark on the stomach, as well as to allay pain and procure rest; to which were occasionally added wine and brandy in considerable abundance, three bottles of the latter having sometimes been given to a patient in less than twenty-four hours, and the same proportion continued for several days*: while recourse was only had to the lancet, where there was obvious proof of very violent local affection.

Alterant and depleting methods.

The times, however, have since changed, and by far the more popular plan of late years has consisted in active, profuse, and repeated venesections, large and quickly renewed doses of calomel, cold affusion, gestation in pure air, and, as advised by some, the bolder exercise and rapid motion of a cart, spring-waggon, or any other carriage.† It was in this manner that Dr. Rush, regarding the inflammatory impetus as the sole cause of danger, boldly resolved to lay prostrate if possible the morbid Hercules at its birth, by bleeding, according to the state of the pulse, two or three times a day during the first two days, and by following up the same plan as long as a single germ of an inflammatory diathesis should continue manifest. "I paid no regard," says he, "to the dissolved state of the blood, when it appeared on the first or second day of the disorder, but repeated the bleedings afterwards, in every case, when the pulse continued to indicate it. It was common to see

Rush's practice as to bleeding;

* M'Cabe, in Edin. Med. and Surg. Journ., Oct. 1819.

† Hist. and Cure of Fever, by R. Jackson, M.D. part i. chap. xi. pp. 267. 270.

size blood succeed that which was dissolved. The dissolved appearance of the blood I supposed to be the effect of a certain action of the blood-vessels upon it. The presence of petechiæ did not deter me from repeating blood-letting where the pulse retained its fulness or tension." And he affirms, that both petechiæ and vibices disappeared in various cases after bleeding. This plan he often pursued through the fifth and even the seventh day, in the course of which period, from a hundred to a hundred and twenty ounces of blood were frequently taken away by six or eight applications of the lancet.

His purgative plan was not less alert. Ten grains of calomel and fifteen of jalap, was the force with which he opened his remedial attack, and which he repeated every six hours, till the alvine canal was effectually evacuated. This mode of treatment, he tells us, he was led to by accident; and with it he became as successful as he had been unsuccessful under the tamer and more established method.

Under this plan of treatment, the venesection and the calomel were employed on a principle of depletion alone, and of diminishing a real or supposed increased action; and the former on the principle of a *gradual* depletion; Dr. Rush rarely venturing to withdraw more than sixteen ounces of blood at a time, though the venesection was as closely repeated as the patient's strength was conceived to be capable of bearing. Both these remedies have, however, still more lately been employed on different grounds, and under a different mode of management. Blood, instead of being taken away gradually and successively, has by many, and especially by Dr. Jackson, who seems to have introduced the practice, been drawn off, on the accession of the disease, to thirty or forty ounces at once, with a view of making a decisive impression upon the system; the same bold use of the lancet being repeated within three hours, if such impression be not effected: after which "such powers are recommended as *stimulate* to a train of action, congenial to the action of health*:" and calomel, instead of being employed as a purgative, has been enlisted as a powerful alterant and deobstruent, and persevered in, to salivation, by doses of from five to five and twenty or thirty grains every third or fourth hour, according to circumstances, till this point is obtained; which, however, is not regarded as important in itself, but as showing, that the system is sufficiently under its influence. Dr. Chisholm seems fairly entitled to the honour of having first tried and recommended mercury with this intention.† "It ought," says he, "to be a general rule of practice to consider *all* remittent fevers, within the tropics, as symptomatic of local congestion, and inflammation. It is a rule, the observation of which can never be injurious, — almost always positively beneficial, — and the neglect of which is always productive of harm. Under this view, the judicious practitioner will consider the *tendency* to congestion, as the object of his main attention, and direct his efforts to prevent it. Upon the whole, then, the treatment is reduced to one sentence: — bleeding to the extent necessary, plentiful alvine evacuation, MERCURIAL PTYALISM, and cold affusion‡;" and he adds, in another part of the

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β E. malignus
flavus.

as to purging :

highly successful.

Employed with different views.

Sudden and decisive depletion.

Calomel as a deobstruent rather than a purgative. Salivation a supposed sign of its succeeding.

* Hist. and Cure of Fever, b. II. chap. xi. pp. 267. 293.

† Ibid.

‡ On the Climate and Diseases of Tropical Countries, pp. 46, 47.

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β E. malignus
flavus.

same volume, "Let it never be forgotten, that, at whatever period of the disease salivation is excited, whether the supposed signs of putrefaction have appeared or not, the accession of it is the certain signal of cessation of disease, and of returning health."*

This general plan of Dr. Chisholm has in the present day become highly, and perhaps chiefly, popular; and is powerfully recommended from personal experience of its advantage by Dr. James Johnson†, Sir William Burnett‡, Dr. Boyd§, Dr. Denmark||, and a long list of valuable authorities, who have practised in the one or the other of the Indies; all of whom, however, combine the use of calomel with copious bleeding; the former being regarded as the "sine qua non," or the "sheet-anchor," by some of them: and the latter, being designated by the same terms, by others.

How far such
discrepancies
capable of re-
conciliation.

On a cursory glance, these diversified modes of treatment appear, in many respects, to be directly hostile to each other, and to establish an utter absence of any one therapeutic principle common to the whole; but a closer attention to the subject will show us, that there is not necessarily any opprobrium medicorum in the discrepancy, except what results from becoming so exclusively the champion of any one of these respective modes of treatment as to bend every case to its own limits, and thus convert it into a bed of Procrustes: for there seems abundant reason for believing, that, in different situations, or under different circumstances, each of these plans has proved equally judicious and successful; since we have seen, that the disease, under different incidents and coadjuvants, has exhibited every variety of violence, and inclined to almost every variety of febrile type. Where there is not much impetuosity in the onset, no great derangement or prognostic of inflammatory congestion in the larger viscera, where the remissions are regular, and the epidemy is pretty uniform in its character, large and repeated bleedings, as a general rule, must prove mischievous. They will not shorten the career of the disease, but they will convert the remittent into a continued fever: and we shall in the latter stage of its course stand woefully in need of that strength which we shall have squandered away at first, if we have commenced with profuse venesection.

Where copious
venesection and
purgings must
be mischievous.

Further
illustrated.

This is more especially the case where the disease makes its attack slowly and insidiously, assuming in some degree a typhous guise, as in the Guzzerat form, described by Mr. Gibson of the Bombay Medical Department¶: in which he tells us, that the debility is so great and instantaneous, as well as the tendency to putridity, that bleeding is never to be hazarded, except occasionally, to the robust new-comer; and in which, even spontaneous hemorrhages, instead of proving critical, have always seemed to hasten death, and, indeed, without a single exception in his experience, to prove fatal. And it was probably from a survey composed largely of cases of this kind, though in the West Indies, that Dr. Hunter, in a tone still more generally proscriptive, and which will meet

This view some-
times carried to
an extreme.

* On the Climate and Diseases of Tropical Countries, p. 215.

† Influence of Tropical Climates, &c. pp. 50, 51, et passim.

‡ On the Bilious Remittent Fever of the Mediterranean.

§ De Febre Minoræ, &c. 1817.

|| Medico-Chir. Trans., vol. vi.

¶ Edinb. Med. and Surg. Journ., vol. xi.

with few defenders at present, thought himself justified in affirming respecting venesection, that even "in such cases as seemed most to require it — for example, where the patient was young, strong, of a full habit, and lately arrived from Europe — when the pulse was quick and full, the face flushed, with great heat and headach — and all these at the beginning of the fever — bleeding did no good." *

Dr. Pinckard, in his "Notes on the West Indies," has given a very interesting description of his own sufferings under this disease, and of the remedial process to which he had recourse. His attack commenced in the more common manner, slowly and insidiously, and demanded eight or nine days to reach its acme. His head, stomach, and at last his bowels, were severely affected, especially the first; but his intellect continued sound; and though the symptoms were vehement, there seems to have been little tendency to that violent visceral inflammation which in the stage of debility is so apt to produce gangrene; and consequently he had no black vomit. He lost twelve or fourteen ounces of blood at the commencement of the disease, and took a strong dose of calomel, which considerably relieved the pain in his head and eyes, and diminished the restlessness; but the thirst, heat, and dryness of the skin were still intense; and his weakness became extreme. Affusions of cold water, old hock, opium, and bark, were made use of in profusion, and each seemed to afford great relief. Yet, on the subsidence of the fever, he represents his feebleness as most deplorable. Here a freer use of the lancet could have been of no avail, and, had not the author most judiciously forbade its further employment, in all probability, he would never have been the historian of his own case.†

On the contrary, if the disease make its incursion with great impetuosity; if the pulse be full and strong, or even if it be only hard, and there be great tendency to inflammatory congestion in any of the larger organs, as the head, the chest, or, as is far more common, the stomach, the spleen, and the liver, we cannot well be too bold both in bleeding and purging; and the plan laid down by Dr. Rush is by no means an exaggeration of what ought to be pursued. It may be, that eight-and-forty or even four-and-twenty hours are the whole we have to work in; and unless we can completely break down the inflammatory diathesis, the organs mostly affected will in all probability become gangrenous in a day or two, the oppressed blood-vessels will give way, and we shall have a chlorotic or livid skin, cold extremities, black vomit, and all the other apparitors of death, before the tamer plan of aperients and diaphoretics could have time to produce the slightest impression on the system. Generally speaking, it will be best to bleed in an erect position, for the sensorial excitement, which is what we are chiefly to aim at, is best cut down by syncope, which an erect position will soonest induce; and we may hence save the expense of several subsequent bleedings.

Dr. Pym speaks with a very just discrimination upon this subject, in observing that, while the Bulam fever, or the disease in its most

GEN. III.
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β *E. malignus*
flavus.

Pinckard's account of his own attack.

Where both means must be beneficial, and ought to be employed.

* On the Diseases of Jamaica, p. 118. 3d edit.

† Vol. iii. letter XII. p. 134.

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β E. malignus
flavus.

violent attack, is relieved by free venesection, the yellow fever, more properly so called from the brighter hue on the surface, or, in other words, that which is slighter in its incursion, will not often endure the lancet. Dr. Musgrave's statement seems to oppose this assertion, for he distinctly tells us, that "blood-letting in both forms is our sheet-anchor; the only pillar on which we can securely rest any hope of *extensive* success." The Antigua fever seems to have exhibited great severity in most instances, and hence called for a courageous course of practice with perhaps few exceptions. Yet the following paragraph proves, that it did admit of exceptions, and softens down almost to unanimity a clash of opinion and practice which, after all, is more ostensible than real: — "We have repeatedly," says he, "with success, taken upwards of forty ounces of blood at one bleeding. With equal success we have in several cases renewed the bleeding up to the third, and even the fourth time; but, generally speaking, those which require such reiterated evacuation evince an obstinacy NOT LIKELY TO ADMIT OF A FAVOURABLE RESULT UNDER ANY MODE OF TREATMENT. IT MUST ALSO BE REMEMBERED, THAT EVERY ONE WHO APPLIES FOR ASSISTANCE IS NOT ALIKE ABLE TO BEAR THIS LIBERAL DEPLETION." It only needs to be observed further, that the bowels were emptied, as they ought to be, by calomel or jalap, or some other active purgative; the head was shaven, and cold ablution preferred ordinarily to cold affusion, because of the fatigue endured under the latter. Bark was then instantly given, and, where the stomach would bear it, in the form of powder. Mercury, with a view of exciting salivation, was seldom tried, and not relied upon. In effect, in the milder cases it was not wanted for this purpose, and, in the more urgent, there was no time for its use.

Mercury beneficial when dis-
criminately
used.

There can be no doubt, however, of its being highly advantageous in a great multitude of cases, and of general benefit in various forms of this destructive epidemy. For, whether we contemplate the fever as local or unrestrained, as consisting in violent universal excitement, or, according to M. Broussais, in an inflammation of the mucous membrane of the stomach or duodenum irritating the bile-ducts, and the liver itself by sympathy; whether as threatening congestion to any of the larger organs, or actually accompanying congestion; there is no medicine which, *primâ facie*, affords a better prospect of relief than mercury, from its general action on the excrement system, as well as its specific action on the intestinal canal and the salivary glands. It must, however, be admitted that it is only under a particular condition and tone of the vascular frame that it can at any time be employed with good effect; and, hence, not only is a sound judgment constantly demanded in its application, but much important time is often lost in preparing the system for its remedial introduction. In the case of *ENTONIC* or strong vascular action, it is necessary, first of all, to lower, and, in the case of *ATONIC* or weak vascular action, to raise the living power to the proper standard before ptyalism can be obtained, which is the grand test of its having taken effect: and, hence, to accomplish the former, bleeding, purgatives, and cold affusion, must be first called upon to exercise their respective powers, and, in the latter case, tonics and cordials; upon which last ground, Swediaur tells us that the most efficacious

Other remedies
usually em-
ployed before
or in conjunc-
tion:

plan of treatment consists in giving calomel and columba, in doses of *thirty-five* grains each, five or six times a day.* It is truly said, indeed, by the advocates for mercury, that such other remedies are all valuable adjuvants; and this is so far from being denied by those who are hostile to the use of mercury, that they affirm, on the contrary, that the benefit ascribed to this medicine, when it has once obtained a sway over the system, ought rather to be attributed to these adjuvants themselves, which would have proved still more beneficial had they been left to their own power and intention alone. Mr. Gibson, who is a strenuous advocate for the use of mercury upon the principle now adverted to, very candidly admits both these causes of impediment. "In hotter climates," says he, alluding to the debilitating province of Guzzerat, "the PHLOGISTIC state of the system is adverse to the introduction of mercury: but the prudent abstraction of blood happily reduces it to that standard which is most favourable for its action. In India, however, in fever, the disease in which this is *most speedily* to be desired, the same means would but in very few cases be admissible: for the DEBILITY IS SO GREAT and instantaneous, as well as the tendency to putridity, that only in the robust new-comer is it, if ever, to be hazarded. It would seem that DEBILITY AND THE PLETHORIC SYSTEM ARE EQUALLY INIMICAL TO THE SPECIFIC MERCURIAL ACTION. If the patient is fortunately invigorated sufficiently to give the mercury influence, and BEFORE ANY ORGAN ESSENTIAL TO LIFE IS INJURED, by the strictest nursing and attention afterwards, the recovery is almost certain, all morbid action yielding from the moment pytalism is brought on."†

Even in cases, however, in which the mercurial action is fortunately excited, the same intelligent writer tells us that he has frequently met with a very serious evil resulting from the mercury itself; for such, says he, is at times the profusion of the pytalism, when once induced, that the most disagreeable consequences succeed, and the convalescence is long and precarious; on which account he laments that we have no criterion to determine how far we may proceed with the mercurial process, and when we ought to stop. Dr. Bancroft advances much further than this, and asserts that not only has the salivation retarded the convalescence, and produced very troublesome affections of the tongue, mouth, and throat, with other ill consequences thus acknowledged by its advocates, but that the salivators, even when they have been free from these evils, have not been more successful than other practitioners; and he particularly alludes to the admission of Dr. Rush, who was not unfriendly to the mercurial mode of treatment, that, "in the City Hospital (of Philadelphia), when bleeding was sparingly used, and the physicians depended chiefly upon salivation, MORE THAN ONE HALF DIED of all the patients who were admitted"‡ For like reasons, Dr. Jackson speaks with as little satisfaction of the same practice, not only upon his own experience but even upon that of Dr. Chisholm himself. Alluding to the high recommendation of mercury by the latter, he observes, "the detail of his testimonies does not warrant a conclusion so favourable; for the

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β E. malignus
flavus.

to which many
ascribe the
whole benefit.

Gibson.

Estimate of its
salutary and
injurious
effects.

Bancroft.

Jackson.

* Nov. Nosol. Meth. Syst., i. 28.

† Edin. Med. and Surg. Journ., vol. xi.

‡ Essay on the Disease called Yellow Fever, &c. 8vo. 1811.

GEN. III.
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β E. malignus
flavus.

proportion of mortality in the detachment of Royal Artillery, upon whom this practice is supposed to have been first tried, has perhaps scarcely ever been exceeded in a tropical climate. Further, it is a common observation, that, where salivation actually takes place in continued fevers, it seldom shows itself till the violence of the symptoms has evidently abated: hence, a suggestion arises that the appearance of salivation is only an indication of the departure of disease—no proof exists that the operation of the mercury is the cause of this departure. Such are the remarks which occurred in reviewing different modes of treatment in the hospitals of St. Domingo; to which it will not be superfluous to add an experiment made at the Mole in August, 1796, by Mr. Lind, Surgeon of Jamaica. Out of fifteen cases of fever put under the care of Mr. Lind, on *the first day* of the disease, and treated with the utmost attention, five died; in three of whom, salivation actually took place; five recovered, in whom no salivation took place; in the other five, who also recovered, salivation was evidently established; but, as is usual, not till the violence of the symptoms had begun to abate. Out of four who were put under his care, on *the second day* of the disease, no one died; but one only was affected by the mercury; one, brought to the hospital on *the third day* of the illness, died: mercury was employed, but no salivation took place; one, on *the fourth*, likewise died, without marks of salivation; one, on *the fifth*—the salivation was established, but the disease proved fatal. In none of the above cases were less than ten drachms, and in most not less than two ounces of strong mercurial ointment rubbed into the legs and thighs, with the employment of all other means which seemed calculated to promote the expected effect.”*

Hence the
question still
doubtful.

The question, therefore, to say the least of it, is still open; and, admitting all that can be said in favour of employing mercury as a sialagogue, the evils which flow from the uncertainty of its action, both in respect to time and degree, and its frequent inroads upon the constitution, even where it has been of use, are serious and important.

Emetics.

On the employment of EMETICS, there is now no longer any question. It is admitted, on all hands, that, in the irritability of the stomach and its collateral organs during this disease, they are generally improper, and almost constantly augment the morbid action; on which account, even the antimonial sudorifics are of very doubtful efficacy, and, whenever ventured upon, should be combined with opium. And, for the same reason, the use of carriage exercise, so strongly recommended by Dr. Jackson, and some of the most distinguished American practitioners, even “under the inconveniences of a scorching sun, of clouds of dust, and of a jolting cart†,” has rarely been put to the test, except in the emergency of the sudden retreat of an army: and has hardly been allowed to enter into the catalogue of ordinary remedies.

Carriage
exercise.

General
summary.

The general treatment, indeed, may be summed up in few words. Copious bleeding, a free repetition of active purgatives, combined with opium where the ventricular irritation is considerable, in the

* History and Cure of Fever, part i. ch. xi. pp. 293, 294.

† Jackson, ut suprâ, p. 287.

commencement of the fever; frequent sponging, or affusion of cold water, with an interposition of the neutralised salts as diaphoretics, during its progress; and bark and other tonics, as soon as the febrile commotion begins to subside. The more powerful and violent remedies of repeated bleedings to faintness, mercurial salivation, or the stimulants of spirits, ether and opium, being alone added to the list, according to the circumstances of the individual case.

Pure air, by a ventilation of the atmosphere, is, however, a more powerful remedial agent than all the rest put together; and to this position I apprehend every class of writers will accede, how much soever they may differ upon other points. The Army Medical Board is, therefore, peculiarly entitled to the gratitude of the country for the great pains it has taken to give improvement to this important object, by an establishment of open and wide-spreading encampments, instead of confined and unperflated barracks; and no man can hear of the desirable success with which this enlightened measure has been attended without exultation. The attempt, as I am permitted to state from the manuscript documents in the possession of the Board, has been made at Barbadoes, Tobago, and Antigua; not more than four individuals being allowed to occupy a single tent, instead of ten or twelve, which is the usual proportion at home: and the success developed in these islands has already become so considerable and decisive, that government has consented that a like trial should be made in all the islands around them. In the affected crew of the *Pyramus*, distributed by Dr. Hartley into an encampment at Antigua, in the year 1822, not a single case of fever was found to travel from one individual to another. We cannot wonder, therefore, at beholding this able officer anxious, in his report for 1823, that the same plan should be extended to other places, and adopted in other diseases. "In cases of sickness," says he, "and especially in yellow fever, I feel convinced in my own mind, that nothing could prove so beneficial in checking the ravages of this disease, as separating the troops; and particularly by removing them to some distant dry field from the locality of the attack. Nothing could more immediately substantiate the advantages of removing and encamping a body of men, than the result in the *Pyramus's* crew."

In Barbadoes, where, as I have just observed, the same improvement has obtained a footing, the mortality for the last two years is almost incredibly abated. I have examined the tables, subjoined to the annual reports in the office of the Army Medical Board, and have found that, from having been upon an average of seven years, about one in twenty-one of the sick list, in 1822, the mortality was only one in twenty-four; and, in 1823, only one in thirty-five. In this last year, however, it should be observed, that the hospital list was somewhat enlarged by the occurrence of an influenza unaccompanied with much danger; yet the aggregate of patients amounted to not more, than about a hundred beyond those of the preceding year. I am ready to allow, that several other important regulations, for which we are equally indebted to the vigilance and the judgment of the Army Medical Board, may have contributed to this salutary change; but the greater part of it is still, perhaps, to be ascribed to the new plan of encamping. I cannot give a better description of the adjuvant regulations I am now referring to, than by adopting

GEN. III.
SPEC. II.
β E. malignus
flavus.

Pure air by ventilation the most important mean of cure.

Establishment of encampments for this purpose; and their great benefit.

Adopted in Barbadoes, Tobago, and Antigua: and about to spread further. Benefit illustrated in the crew of the *Pyramus*.

Hartley's encomium.

Exemplified a Barbadoes.

Other coincidents.

GEN. III.

SPEC. II.

β E. malignus
flavus.

Tegart's report.

the words of Mr. Tegart, an enlightened inspector of hospitals at Barbadoes, who, in his manuscript report for 1823, thus enumerates them, and at the same time confirms the ameliorated health of the soldiers quartered in that station, and to which I have just referred. "The loss in that year," alluding to 1822, or the preceding, "was so comparatively small with former ones, that I hardly hoped to send so favourable a one again. This return, however, exceeds greatly any hopes I could have anticipated; being not one half the average amount of the preceding six years; and not a sixth part of the yearly loss sustained in the fourteen years antecedent to those. There are many reasons for this favourable change: the men are better clothed, better fed, and better looked after by their officers; there are many local improvements in the vicinity of the barracks, which formerly were not much attended to: such as draining swampy and marsh ground; clearing away brushwood and long grass, which harboured moisture, and emitted, at certain seasons, noxious exhalations, producing fever and other diseases, the treatment of which was very different from that of the present day. I believe most sincerely, that we are also indebted for the favourable comparison in the scale of mortality to the improved education of medical men, to the discoveries in the various branches of medical science, and to the rationale of medical practice." The writer of this work cannot avoid adding his conscientious assent to the correctness of these views.*

γ E. malignus
causus.

How described
by Hippocrates.

Febris gastrico-
inflammatoria
of Frank.

There is another variety of malignant remittent, which has been known to medical practitioners from the time of the Greeks, though less frequent than the yellow fever, and which, by Hippocrates, has been denominated CAUSUS; as it has by later writers, who have only translated the Greek term, been called FEBRIS ARDENS, ARDENT OR BURNING REMITTENT. From its being usually accompanied with much disturbance of the stomach and intestines, it is called by Professor Frank, *febris gastrico-inflammatoria*, as the last variety is *febris gastrico-nervosa*. In Hippocrates, it is briefly described as a fever, characterised by extreme heat, violent thirst, a rough and black tongue, complexion inclined to yellowish, saliva bilious. There is commonly an acute aching in the head, nausea, great anxiety of the præcordia, with frequently a gnawing pain at the stomach. The bowels are unusually costive, particularly at the commencement of the disease. The tongue, mouth, nostrils, and, indeed, the whole surface of the body, are parched and fiery-hot, whence, indeed, the Greek name for the disease; the pulse is full and strong; the voice hoarse; the breathing short and quick, with sometimes a slight cough, and occasionally delirium.

Causes various.

It chiefly attacks the young and the vigorous, who bear the attack better than old persons. The causes to which it was formerly ascribed, are long exposure to the heat of the sun, great fatigue

* Our author has not spoken of the proposal to cut short the disease by the administration of bark, arsenic, or other antiperiodic remedies, as in intermittent fever. Now, with reference to this suggestion, Dr. Joseph Brown very judiciously observes, that, in order for it to be tried with safety, the remission must be so perfect, as to amount to an actual apyrexia, and the disease would then be identified with intermittent fever; and he has almost uniformly noticed, that the employment of any antiperiodic in truly remittent fevers not only failed, but invested the disease with a more continued and dangerous character. Cyclop. of Pract. Med., art. FEVER. — ED.

from undue exercise or labour, or too heating a diet. It has of late, however, been supposed, and with much plausibility, from its frequent occurrence towards the autumnal equinox, and especially from its resemblance to the yellow fever, that, like the latter, its ordinary remote cause is the miasm of swamps and marshes. And, if so, it affords us a proof, that, under certain modifications, febrile miasm issuing from this source may, as I have already suggested, produce a caumatic or inflammatory, as well as a synochous or typhous tendency, in constitutions predisposed to this character of fever*; for the *causus* is, in fact, whatever be its cause, a vehement inflammatory remittent. It is on this account, that Dr. Mosely conceived the *causus* of the ancients, and the yellow fever of the present day, to be one and the same disease; whence he applies to the latter the Greek name of *causus*. This, however, is not quite correct: for in the real *causus*, the burning heat is more intense, the thirst more intolerable; while the stomach is generally less irritable, and will bear vomiting with advantage: and, in the second stage, the chilliness which, in the yellow fever, is merely accompanied with horripilation, and is a mischievous symptom, in the *causus*, is accompanied with a smart rigor, which often terminates in a copious and salutary sweat. The process, moreover, in the *causus*, generally lasts only four days, and is terminated, when left to itself, by a critical diaphoresis, vomiting, diarrhœa, or nasal hemorrhage; but, if the fever be not carried off in this way, it commonly becomes fatal.

We have, nevertheless, satisfactory proofs, that though the *causus* and yellow fever be not precisely the same disease, both often issue from the same febrile miasm, and sometimes run their race conjointly; the difference depending chiefly upon the idiosyncrasy, or the peculiar condition of the constitution at the time of attack.

Thus, in that most formidable assault of yellow fever which took place at the Mole in St. Domingo, in the autumn of 1796, Dr. Jackson tells us, that “the symptoms of the disease, among a set of men vigorous by nature, and often transgressing the rules of temperance, were *ardent* and *violent*, with much vascular excitement in the early periods, often subsiding on the third day, and terminating rapidly in black vomiting, and a formidable train of horrors.”† And he has since met with the same form in Spain, which, in effect, constitutes his first division of the Andalusian fever.‡ And, hence, Dr. Chisholm informs us, that “the diseases, which originally proceed from marsh exhalations, may be so impressed with the action of irregular temperature as to render them *highly inflammatory*, although the character and nature of the original are so manifest, as to make a mode of treatment suitable to the two diatheses, or rather the mixed diathesis, prevailing in the system necessary.”§ And, in proof of his remark, he has quoted several instances from the report of the Army Medical Board, of which that which occurred

GEN. III.
SPEC. II.
γ E. malignus
causus.
Probably
febrile miasm.

Confounded
with yellow
fever by
Mosely.
Distinctive
character.

Yet nearly
connected.

Proofs :
from Jackson ;

from Chisholm ;

Army Medical
Board.

* Devèze, *Traité de la Fièvre Jaune*. 8vo. Paris, 1820. Saverésy, *De la Fièvre Jaune en générale, et particulièrement de celle qui a régnée à la Martinique en l'an 1803-4*.

† Hist. and Cure of Fever, &c. part i. ch. ii. p. 66.

‡ Remarks on the Epidemic Yellow Fever on the South Coast of Spain. Lond. 8vo. 1821.

§ Manual of the Climate and Diseases of Tropical Countries, &c. part iii. chap. i. 8vo. Lond. 1822.

GEN. III.
SPEC. II.
7 *E. malignus*
causus.
St. Christo-
pher's.

in the year 1812, at Brimstone Hill, St. Christopher's, is probably most worthy of notice, on account of the topography and general healthiness of the spot, which is described as follows :—

"Situation, N. Lat. 17°—soil light and dry—composition, rock and sand—elevation, six hundred feet—distance from the sea, a quarter of a mile. Barracks exposed to currents of air and strong winds, directed on them by ravines. No swamps in the neighbourhood. Change of temperature sudden, from 70° to 80° and 90° in the course of a few hours. RAIN ABUNDANT. Probable cause, previous hot dry weather, ill-ventilated and ill-constructed barracks, some of them bomb-proof. Epidemic cause unknown; and prevalence of the disease cannot be accounted for."

Explained.

The cause, however, is not difficult to assign; and, in truth, we have already adverted to it in describing the occasional origin of yellow fever: for, however dry and elevated the situation may be, yet, on the descent of copious and continued rains, such as are here set down, a temporary swamp is very soon produced, and of sufficient power, in hot climates, to generate, even "on a light and dry soil, and a sandy rock," febrile miasm enough for the severest epidemic; and especially where such miasm receives the collateral aid of ill-ventilated barracks, and currents of cold air blowing down long ravines directly upon the troops while in a state of perspiration; and producing a sudden abstraction of animal heat, more mischievous, perhaps, within the tropics, than on the banks of the Coppermine River during the snows of the winter season, where, as Captain Franklin informs us, the Chipewyan Indians find them the most detrimental and destructive to life of all the numerous and heavy evils to which they are exposed.*

The fever continued through the winter, evidently in this case kept up by its having become contagious. It was at first confined to one of the barracks occupied by a company of the 25th regiment; and its symptoms are thus briefly but forcibly described:—"Type continued:—thirty-four admissions from this company alone: symptoms, in all, of a most unfavourable character from the first attack; great headach, sickness, and vomiting; pulse full and hard; eyes inflamed; face flushed; ardent heat of the skin; in many cases yellowness of the whole body on the second day of the disease. The entire number of cases were four hundred and twenty-two: of which not fewer than one hundred and eighteen died, affording a mortality that treads close upon the heels of that in the plague."

Treatment.

In the treatment of this variety, the advocates for copious bleeding and for free doses of calomel, may shake hands; for both may be allowed with liberality. The calomel, however, is found most successful when combined with antimonials or Dover's powder. Free purging is also to be strongly recommended: the means, in effect, whatever they are, must be vigorous to be of any avail:—for the disease itself is of great vigour and rapidity; and, unless prostrated at the onset, will soon prostrate the patient. In conjunction with this process, we may also adopt that of Hippocrates, who, in the burning remittent of his own day, employed cold applications in every way: the coldest possible drinks; and the coldest possible

Cold drinks.

* Narrative of a Journey to the Shores of the Polar Sea, &c. p. 249. Lond. 4to. 1823.

clysters, and ablution with cold water applied to every part of the body.* Under proper regulations, there is no doubt of the advantage of such a treatment; and the medical process of the Continent, as well as that of our own country, throngs with cases, in which it has been found serviceable. Marquet recommends the application of cold air as well as of cold water; and gives an instance of a rapid cure in one, who, in a state of delirium, exposed himself naked to the cold of the atmosphere out of doors.† And on this account Schäffer advises that the patient, in any acute fever accompanied with dry burning heat, should be carried forth from his chamber, on a mattress, and thoroughly ventilated abroad.‡ Dr. Jackson would indeed have him ventilated in any way, even on a cart or waggon, if there be no easier conveyance.

In the preceding varieties, the malignant remittent has shown a tendency to an inflammatory or a synochous career. Under particular circumstances, however, it evinces a like inclination to a deep nervous depression, sensorial debility, or A TYPHOUS CHARACTER from the first. And this, whether the febrile miasm originate from a decomposition of marsh, or of human effluvium; for the records of medicine furnish us with innumerable instances of both. In the two cases, however, there are a few slight variations in the range and mode of its action, the laws of which I have already endeavoured to lay down as far as we are acquainted with them§; and hence M. Bally, confounding this variety with proper yellow fever, calls the latter, the *American typhus*, and makes two divisions of it, a contagious and an uncontagious, according to its degree of violence.|| This modification of the disease, therefore, is best distinguished by the name of ASTHENIC REMITTENT.

The epidemics of this kind, accompanied with most mortality, are those which arise from a decomposition of human effluvium in the midst of filth, poverty, or famine, great heat and moisture, crowded multitudes, and a stagnant atmosphere: for here we have almost all the auxiliaries of febrile miasm operating for its production. The remittent epidemics of Cadiz and Malaga seem chiefly to have been of this kind: and they are the common pestilences of dispirited armies, maintaining their ground with difficulty in the midst of great carnage, surrounded by the dead and the dying, reduced to short provisions, and worn out by the fatigues of the campaign. The writings of Sir John Pringle are full of examples of this kind: and Professor de Haen has given a striking description of the same in his account of the contagious epidemic that committed such tremendous havoc throughout the Prussian army, at Breslaw and its vicinity, in the middle of the last century, constituting the disease to which M. de Sauvages has given the name of *Tritæophya Vratislaviensis*. It was peculiarly distinguished by irregular action, great debility, and overwhelming dejection of mind. The lypyria, or coldness of the surface, with which the disease opened, rarely yielded to any general reaction, for the extremities seldom became warm, and

GEN. III.
SPEC. II.
γ E. malignus
causus.
Cold water.
Cold air.

δ E. malignus
asthenicus.

Originate both
from marsh
and human
effluvium.

The most fatal
cases from
human efflu-
vium.

Exemplified in
the late epi-
demics of Cadiz
and Malaga,
chiefly of this
variety.

Noted epidemic
of Breslaw.

* Περι Παθων, p. 518. lib. 48. 51. p. 419. lib. 37.

† Observations sur la Guérison de plusieurs Maladies.

‡ Versuche, i. p. 164.

§ Vol. i. p. 588.

|| Sur le Typhus d'Amérique, ou Fièvre Jaune, &c. Paris, 8vo.

GEN. III.

SPEC. II.

δ E. malignus
asthenicus.

De Haen's
statement of
his own case.

were often rigid and convulsive; at the same time that the interior parts burned like a fire; the head and stomach suffered with acute pain; there was great anxiety about the præcordia; and so exquisite a soreness over the entire surface, that the patient had the greatest dread of being exposed to the contact of the external air, a mere change of the temperature being intolerable. De Haen himself at length became a prey to the infection, and his attack commenced as thus far stated. On the fourth day, he tells us, all his symptoms were worse, his feet quite chilled, but his hands red, and agitated with convulsive motions; he had occasional vomitings, and was terrified with the image of impending death. On the eighth day the pulse was convulsive, and he was continually crying out from his pains. On the ninth, delirium, and a rejection of grumous blood from the stomach. On the eleventh, perspiration and a tranquil pulse, but the voice was broken, the speech was interrupted, and the teeth grated. On the twelfth, the jaw was convulsed, there was a sardonic laugh and deafness. On the fourteenth, an icy coldness covered the whole body, accompanied with a cold sweat, but a frequent use of ablutions afforded relief. On the eighteenth, he had a vivid delirium, but fainted on being taken out of bed; which was succeeded by hunger, copious sweats, and profound sleep, with an intolerance of noise. At this time, every thing appeared new and extraordinary; a feeling described by many sufferers as soon as the violence of the disease begins to abate, and which Dr. Pinckard has very strikingly noticed in his own case. The symptoms varied considerably from this period, and he had still many dangers to contend with. He recovered, however, though very slowly, and with numerous drawbacks; for, on the thirty-sixth day, he had a cholera, and on the forty-eighth, his skin scaled off and he lost his nails.

Sequel of the
disease.

Towards the close of the disease, the skin was covered with a scabid or ichorous eruption, rather than petechiæ; evidently from debility of the capillaries: a fact that has often occurred even in the slighter attacks of this variety of remittent in our own country, when it has occasionally broken out, as in 1765, among the troops stationed in the vicinity of Portsmouth, and is particularly noticed by Dr. Lind. In this last case, it was often suspected to be the itch, to which it had a very near resemblance: and it is highly probable, that, in many instances, it was so, and that the *acarus scabiei* found, in the sores, a convenient nidus for the deposit of its eggs.

Exemplified as
produced from
stagnant
marshes.

Cape Coast,
Africa.
Gombrow on
the Persian
coast.

There are situations, however, in which the febrile miasm, producing this low variety of remittent, is generated by a decomposition of the stagnant matter of humid marsh-lands; such chiefly are the regions about Cape Coast, in Africa, especially when visited by the foul and smouldering harmattan, and about Gombrow, or, as Sir John Chardin calls it, Bander-Abassi, on the Gulf of Persia*: in which last place the mortality is so severe between the months of April and September, that the deaths are ordinarily calculated at nine out of ten of the inhabitants, and this notwithstanding that most of them retire during such period towards the mountains, and all mercantile concerns are relinquished; so that, says the chevalier, "la moisson est fermée, comme un parle." The dis-

* Voyage du Chevalier Chardin, &c. tom. ix. p. 511—518.

eased are commonly removed higher up the country as soon as they sicken; but, whether removed or not, they usually die in four or five days.

There can be no doubt, that, in both these places, the danger of the disease may be augmented by the dense and stinking vapour that is perpetually blowing upon them during the pestilential season, the "puantes vapeurs de la mer," as Sir John expresses himself, "qui font bondir le cœur la première fois qu'on les sent." These on the African coast are impregnated from the impenetrable mangrove swamps of the interior of Guinea, and on the Persian, from the saline and sulphurous exhalations of the several adjoining islands, which the winds of the season pass over in their periodical sweep; and the copious disengagement of hydrogen, whose presence the intolerable stench seems to indicate, will account in no small degree for the deficiency of living power, which so peculiarly distinguishes the malignant remittent in these quarters. In the latter region, indeed, some such debilitating influence seems to operate habitually: for the ingenious author thus quoted, adds, that "the nations carry in their complexion and constitution the proofs of their malignant atmosphere, being yellow and ghastly from the age of twenty-one, and decrepid at thirty." Of the destructive power of such vapours, we have sufficient proof from what occurs on the coast of Batavia, and the islands that immediately surround it: for if, by judicious treatment, a patient in this quarter should become convalescent from an attack of yellow fever, he is still almost certain of falling a prey to the disinvigorating and deliquescent influence of the noisome exhalation by which he is surrounded, and especially between sunset and sunrise, unless timely removed to a more salubrious quarter.

We may hence readily conceive how yellow fever may, under certain circumstances, have a strong tendency to the same asthenic character, and run rapidly into a typhous form, or be combined with its symptoms from the first.

This is, in truth, the hybrid disease of Sir Gilbert Blane, Dr. Lemprière, and Dr. Dickson. "In certain seasons," says Dr. Jackson, "in certain situations, and in certain periods of the year, the character of the ENDEMIC is insidious and *malignant*. The disease under those circumstances often begins regularly as a single tertian; and two, and sometimes three revolutions pass over without giving any alarm to ordinary observers: but at one or other of the above periods, a paroxysm commences with coma, stupor, and suspension of functions, threatening immediate destruction: or, as often happens, the energy of action becomes less and less distinct in every succeeding paroxysm; the skin becomes dry, or damp and greasy, the powers of life are overwhelmed, the pulse contracts itself, or becomes apparently weaker and weaker under the use of bark, wine, and the strongest stimulants of the *materia medica*."* His second form of the Andalusian fever of 1820, is precisely to the same effect.†

It is to this variety of the endemic of intertropical regions, that Dr. Chisholm has given the name of *malignant pestilential fever*. "It must be kept in mind," says he, "that this, the most tremend-

GEN. III.

SPEC. II.

δ E. malignus
asthenicus.Danger augmented by
dense offensive
vapours.Coast of
Batavia.Discrepancies
of symptoms
accounted for.Hybrid fever
of authors.
Blane,
Lemprière,
Dickson,
Jackson.Malignant
pestilential fever
of Chisholm.

* Hist. and Cure of Fever, &c. part 1. ch. xi. p. 277.

† Remarks on the Epidemic, &c. on the South Coasts of Spain, 1821.

GEN. III.
SPEC. II.
§ E. malignus
asthenicus.

ous of all the tropical diseases, wherever it appears, is the typhus of Europe, grafted on the yellow remittent fever of the torrid zone, or of countries whose climate, during part of summer and autumn, possesses the temperature of the torrid zone.* “It is evident,” says he in another place, “that typhous infection does exist, perhaps does originate, within the tropics. How fraught with mischief, therefore, is that theoretical notion, that such infection cannot exist, cannot originate, and cannot be propagated in hot climates. Let the young and unexperienced practitioner guard himself against it; and be prepared for it when he meets it.”†

Bulam fever.

Edam remittent
of Shields.
Trinidad re-
mittent of
M'Cabe.

Dr. Chisholm offers a variety of examples in proof of this assertion, to several of which he had been an eye-witness, especially to that which is so well known to have broken out in the unfortunate attempt to colonise the Island of Bulam in the spring of 1793, and which gave rise to the fever of this name, so strikingly characterised by its asthenic signs. He has noticed others also, of nearly equal demonstration, extracted from the reports communicated to the Army Medical Board of our own country. But, perhaps, none offer more striking proofs of this peculiar type than the Edam remittent of 1800, described by Mr. Shields, and that of Trinidad of 1819, described by Dr. M'Cabe.‡ In the former of these, the marks of an extreme debility were often peculiarly impressive from the first. The patient, with little previous notice, was seized with giddiness and cold chills, great sense of weakness, pain over the orbits and in the epigastrium, together with vomiting. He frequently fell down and was insensible during the paroxysm, his body covered with a cold clammy sweat, except the pit of the stomach, which always felt hot to the palm of the hand; the pulse was small and quick; great torpor in the intestinal canal; the pupil dilated and incontractile; great despondency at first, then low delirium or insensibility to danger. The patients, while on the island, were carried off in eighteen, twenty-four, thirty, or forty hours: though often, when removed, not till after as many days. So malignant, indeed, was this pestilence, that “almost every one who slept on the island a single night died.” The organs chiefly affected, were first the brain, and in succession the stomach and liver. In the Trinidad remittent, so reduced was the vital energy, that it was found necessary, in various instances, to give the patient three bottles of brandy in less than twenty-four hours, and to continue this proportion for several days.

Medical treat-
ment varies and
ought to vary.

The treatment has here varied as much as in yellow fever; in truth it ought to vary — not, indeed, according to preconceived and general hypotheses, whose only variance consists in fighting general rules against general rules, but in modifying the plan, whatever it may consist in, to the peculiar case.

Bleeding, however, must never form a part of the general practice, how necessary soever it may be in particular instances where atonic congestion may oppress the head or any other large organ. And even in such instances, it will generally be found more expedient to employ calomel in large and repeated doses, than the lancet, unless we see the patient at the very opening of the disease.

* Climate and Diseases of Tropical Countries, p. 167. Lond. 1822.

† Id., p. 43.

‡ Edin. Med. and Surg. Journ., Oct. 1819.

Under either practice, the bowels must be opened, and kept open by active purgatives; since, from the general disturbance of the functionary balance, there is violent action in the abdominal viscera, while the vessels on the surface are entirely torpid. To restore this balance should be our uniform effort: and hence, in conjunction with the above, nothing bids fairer, or has in fact been found more successful, than the use of warm diaphoretics with opium. Cold water as a beverage, or in the form of injection, has also proved a highly refreshing tonic; frequent potations of old hock still more so. The bark is a doubtful remedy, for it often sits uneasy on the stomach, and is rejected. It has hence fallen into undeserved disrepute. When, however, it harmonises with the stomach, and is retained without oppression, it is entitled to all the praise that has been bestowed on it by former writers, and cannot be given too freely. The best preparation of it for the present purpose is undoubtedly the sulphate of quinine. Ablution with cold water has been tried very generally during the malignant remittents of most climates, and always with very great advantage.*

GEN. III.
SPEC. II.
δ E. malignus
asthenicus.

SPECIES III.

EPANETUS HECTICA.

HECTIC FEVER.

PULSE WEAK: STAGES OF CHILLINESS, HEAT AND SWEAT VARIOUSLY INTERMIXED, AND SOMETIMES SINGLE; COLD STAGE EXHAUSTING; EXACERBATION CHIEFLY IN THE EVENING.

THE symptoms of this species, except in its sweating stages, are far less violent, and consequently its duration is far longer, than that of either of the preceding. Nothing, however, can more fully prove its complexity and irregularity, than the different characters given of it, and the different places allotted to it by different authors. Sauvages and Sagar introduce it into the list of continued fevers: Linnæus, Crichton, and Parr, into the present division, or that of remitting and exacerbating fevers: Boerhaave regards it as of a mixed nature, a continued intermittent. "Febris hectica," says he, "est referenda ad febres continuatas intermittentes." Vogel and Cullen degrade it into a mere symptomatic affection. "As I have never," says the latter, "observed a fever of this kind except when symptomatic, I could not consent to admit it into the list of idiopathic fevers, which alone ought to be enumerated."

Those who have adopted Dr. Cullen's opinion, have usually contemplated it as a mere effect of absorbed pus. Dr. Heberden seems to think it dependent upon a local cause, but that irritability in any

GEN. III.
SPEC. III.
Peculiarly
complex and
irregular;
and hence
differently
arranged by
different
nosologists.

By some regarded as merely a symptomatic or secondary disease.

* Epidemia verna quæ Wratislaviam, anno 1737, afflixit. Vide Act. Nat. Curios., tom. x.

GEN. III.

SPEC. III.

Epanetus
hectica.By others as an
idiopathic
affection.Supposed by
J. Hunter to
be derived from
both sources.Why not al-
ways produced
from absorbed
pus.When symp-
tomatic, pro-
duced by gene-
ral irritability.

diseased organ, which cannot be brought into a healthy state, will excite it as effectually as pus introduced into the system.*

On the contrary, Galen, Mr. John Hunter, and Dr. Willan contend, that hectic may be, and often is, a strictly idiopathic affection. The second of these valuable writers regards hectic fever as of two sorts, symptomatic and idiopathic.† The first he ascribes entirely to local irritability, and opposes the idea that it is ever produced by absorbed pus. His argument is, that if absorbed pus be capable of producing it in one instance, it ought in every instance: but this we know is not the case; for we have had large buboes and even empyemas removed by absorption suddenly, and yet no hectic has taken place. He does not think that more pus is absorbed during the existence of hectic fever, than when no such fever is present: but, admitting that this should be the case, he would rather ascribe the increased absorption to the hectic constitution operating upon the abscess or sore, than to the abscess or sore operating upon the constitution; in which case the hectic diathesis is the cause, and the increased absorption is only the effect. So that, even here, he regards the hectic as a primary or constitutional disease.

As a symptomatic affection, however, he refers it to a general irritability of the constitution, produced by sympathy, in consequence of "some incurable local disease of a vital part, or of a common part when of some magnitude‡;" and which becomes incurable from two causes; firstly, because, though the local irritation is small, the constitution is bad, and does not dispose the parts to a healing state: and, secondly, because, though the constitution is good, the local irritation is so considerable, that it cannot muster up a sufficiency of remedial energy to subdue it; and hence, while sympathising in the irritable action, falls a prey to its own efforts.

Yet, says he, it is possible for hectic fever to be an original disease of the constitution; for the constitution may fall into the same mode of action without any local cause whatever, *at least that we know of*. And in this manner he accounts for its existence as an idiopathic affection. And, in effect, nothing is more common than for hectic fever to exist in patients in whom we can trace no local cause whatever: and, in all such cases, we must either indulge in a gratuitous hypothesis, and throw our suspicions at random upon

* The late Dr. Thomas Young, when a boy, had every symptom of tubercles in the lungs, accompanied by hectic fever; but they never attained the stage of suppuration. See his *Practical and Historical Treatise on Consumptive Diseases*, deduced from Original Observations, and collected from Authors of all Ages. 8vo. 1815. — En.

† On Blood, part II. chap. ix. sect. 1.

‡ The period at which the commencement of hectic fever takes place from local irritation or disease, and also the severity of it, are influenced very much by the seat of the original affection, as well as by its nature and extent. "The system will much more readily sympathise with an abscess, or other disease of a vital organ, such as the lungs, heart, liver, stomach, intestines, mesenteric glands, or kidneys, than with a similar disorder, existing in the muscular or cellular tissue, near the surface of the body." Diseased lungs will more quickly bring on hectic symptoms than diseased joints; though, the power of joints to repair some of their injuries and morbid changes, being very inferior to those of many other parts, their diseases are often tedious, and frequently incurable, so that we cannot be surprised to find them often associated with hectic disturbance of the system. — En.

the lungs, or the liver, or the kidneys, or the heart, or the mesenteric glands, or whatever other organ a few casual symptoms may suggest to the fancy : or we must at least act upon the principle of its being an idiopathic affection, even though we should refuse, in terms, to admit that it is so.

"I willingly subscribe," says Dr. Percival of Dublin, in his manuscript comment upon the author's Nosology, "to idiopathic hectic, and have known it to last three months without any pulmonary affection, and then to break out in the lungs."*

There seems, indeed, great reason for admitting, with Dr. Stoll, a *habitus phthisicorum*†, a hectic diathesis or temperament, the features of which are, for the most part, strongly marked, and are to be found in a fair skin, blue eyes, yellow hair, lax fibre, and sanguine disposition. And, wherever this exists, it is probable that most of the causes of other fevers, operating upon it, will produce a hectic.‡ And we can hence readily account for the examples cited by different authors of its being produced by diseased actions or affections of the heart, stomach, mesentery, liver, pancreas, lungs, or brain; by a suppression of various exanthems, or other eruptions, or of various habitual discharges natural or morbid; by other fevers; by chronic inflammations or abscesses. It is well known to be a common sequel to the measles, occasionally so to the small-pox, and, in a few instances, to rosalia or scarlet fever. It may, hence, be a result of dyspepsy; and one case is said to have been produced by eating bacon, which remained undigested in the stomach for a term of eighteen months, when it was disgorged by sickness, and the hectic symptoms disappeared.§ And it is hence possible that hectic fever may occasionally spring, like other remittents, from febrile miasm.||

GEN. III.
SPEC. III.
Epanetus
hectica.

Idiopathic
hectic admitted
by Percival.

Habitus
phthisicorum
of Stoll.

Most of the
causes of fevers
produce it,
where this
exists;

and hence a
frequent sequel
of various
exanthems.

Has been
produced by
dyspepsy.

* With regard to this case, the editor fully coincides with the remark made on it by Dr. Joseph Brown. "From the extreme difficulty of detecting the presence of tubercles in their unsoftened state, even with the improved method of diagnosis now employed, is it not reasonable to conclude, that these bodies had existed in the lungs undetected, and produced the fever; since we find this affection, which of all is most frequently attended with hectic, ultimately displaying itself by manifest signs?" Some years ago Dr. Brown saw a case of *apparently* idiopathic hectic, which proved fatal: on examination of the body, small abscesses were found in the muscular substance of the heart. Cyclop. of Pract. Med., art. FEVER, p. 246.

† Prælect., p. 19.

‡ These are the commonly described emblems of a scrofulous habit in which tubercles, and other forms of local disease, are frequent. Instead of adopting the author's hypothesis, and that of *idiopathic* hectic, it would be more correct to regard hectic fever as a protracted constitutional disturbance, excited and kept up by some local irritation or disease, which is either not immediately curable, or totally incapable of relief. Mr. Hunter considered hectic fever as the *remote* consequence of a local injury or disease, contrasting it with sympathetic inflammatory fever, which he sets down as the *immediate* or earlier effect on the system. He also divides hectic fever into two kinds; one depending upon a disease which would be curable, if the constitution had strength enough to bear the struggle; the other arising from a disease that is absolutely incurable. When Mr. Hunter speaks of spontaneous hectic fever, he seems to mean really nothing more, than that the cause of it is not apparent. — Ed.

§ Arnold. Diss. de Hecticâ Stomachiâ, 1743.

|| Hectic fever may follow visceral disease, brought on by other fevers, but certainly it cannot be correctly stated to be in any instance directly brought on by febrile miasm. — Ed.

GEN. III.
SPEC. III.
Epanetus
hectica.
General
character of
the disease.

Whether pel-
lucid urine be
a symptom.

How dis-
tinguished
from an inter-
mittent.

Stages of the
disease irre-
gular in their
order.

Exacerbations
irregular in
their duration.

Sometimes at-
tacks suddenly
and violently.

The character of the disease is well given by Mr. John Hunter in the following words:—“Hectic may be said to be a slow mode of dissolution; the general symptoms are those of a low or slow fever, attended with weakness, but more with the action of weakness than real weakness; for, upon the removal of the hectic cause, the action of strength is immediately produced, as well as every natural function, however much it was decreased before. The particular symptoms are, debility; a small, quick, and sharp pulse; the blood forsaking the skin; loss of appetite; often rejection of all aliment by the stomach; wasting; a great readiness to be thrown into sweats; sweating spontaneously when in bed; frequently a constitutional purging.”—To which he adds, “the water clear.” There is, in reality, much difference of opinion upon this last point. Dr. Heberden has observed that the same irregularity, which accompanies most other symptoms of the disease, attends this also; that the urine is equally clear or turbid in the exacerbations and the intervals; sometimes clear in the first and turbid in the second; and sometimes turbid in the first and clear in the second; while Dr. Duncan, from long and assiduous attention, asserts, that the urine is peculiarly distinguished by a natural furfuraceous separation. Such is the character it has usually exhibited in my own practice: though, where authorities thus clash, it is not a symptom to be depended upon as a pathognomonic.

From the frequent approaches which the hectic makes towards a perfect apyrexia, it is sometimes apt to be confounded with an intermittent; but there is rarely any remission in which the pulse is not at least ten strokes in a minute quicker than it ought to be; and by this it is sufficiently distinguishable, as it is also by the greater irregularity of its different stages, and, indeed, of all its symptoms.

It is owing to this last feature that, sometimes, the exacerbation commences with a chilly fit, and sometimes without; and that, where there is a chilly fit, sometimes it is immediately succeeded by heat, but sometimes by perspiration, without any intervening hot fit; while occasionally the cold fit only leads to heat, or even terminates singly without either heat or perspiration. Hence the exacerbations must vary in duration: but even where every stage is present, and succeeds in regular order, the duration of the entire exacerbation is almost equally uncertain, inasmuch that it is seldom that three exacerbations of equal length recur in succession. The remissions will sometimes extend to ten or twelve days, without a single intervening pyretic symptom: and sometimes the cold or the hot fit, or the sweating, will be renewed several times in the same day. Yet, let the perspiration appear whenever it may, the patient is never relieved by it, but is as anxious and restless during its continuance as in the heat or chill.

Dr. Heberden * has sometimes seen a hectic attack persons who seemed in tolerable health, in a sudden and violent manner, like a common inflammatory fever: and, like that, in a little time bring them into imminent danger of their lives; after which it has abated, and afforded hopes of recovery. But the hopes have been deceitful; for, the hectic has still been fed by some lurking mischief;

* Trans. of the College, vol. ii. art. i. p. 6.

some concealed local disease; and, resisting the power of medicine, has gradually undermined the patient's health and destroyed him.

More commonly, however, hectic fever commences slowly and insidiously, and is not suspected for some months: and the only symptoms noticeable are, lassitude upon slight exercise, loss of appetite, and a wasting of the flesh. But, if these symptoms be connected with a general increase of pulse, so that the artery beats from ninety to a hundred or a hundred and twenty strokes in a minute, there will be real ground for apprehension.

This is one of many diseases, in which the art of medicine has hitherto laboured in vain to strike into any direct tract of cure. The real cause is commonly involved in great and impenetrable obscurity, and we can do little more than attack single symptoms as they make their appearance.

Where the disease is evidently symptomatic, the case must depend upon curing, or, if incurable, upon removing, when this can be accomplished, the part affected. When idiopathic, we must combat, as far as we are able, the irritable diathesis; and, above all things, endeavour to strengthen, without increasing, the action of the machine. The best sedatives as well as tonics are acids, and of these the vegetable will usually be found preferable to the mineral, since, on account of their corrosive property, the latter can only be taken in small quantities. They abate the febrile heat, diminish the restlessness, and frequently succeed in checking the night-sweats. And if, as is often the case, the patient be tormented with pains in the limbs or joints, resembling rheumatism, and preventing him from sleeping, we may combine the acids with opium. The bowels must be kept regular by gentle laxatives, and the neutral salts seem to answer this purpose better than most others. It will, however, be convenient to vary them occasionally, and sometimes to exchange them for the senna confection, or some other aperient.

Stimulants rarely answer any good purpose; and in many instances, evidently heighten and accelerate the exacerbation. The Peruvian balsam has been given advantageously with nitre; but myrrh is a medicine of fairer promise; and beyond these we can scarcely ever venture to proceed.

The lighter bitters are certainly serviceable in many cases, and may conveniently be employed in combination with the acids; but bark, though tried in numerous instances, and with great perseverance, has not been found successful. Dr. Heberden, however, says, that he never saw it do any harm in the hectic fever, and his opinion is confirmed by that of Sir Edward Hulse, after having prescribed it for forty years. Yet neither of them ever obtained proofs of any beneficial result.*

A light and regular diet, regular hours, and gentle exercise, are coadjutants of great importance. When the disease is dependent upon some local affection, the Bath waters have often afforded a palliative degree of relief; but in idiopathic cases, they usually augment the fever, aggravate the patient's sufferings, and hasten his death.

* The lighter preparations of bark, as the sulphate of quinine, and the infusum cinchonæ, are often found to be eligible tonics in hectic cases; yet they cannot be expected to accomplish much good, if the cause of the constitutional disturbance continue undiminished, or unremoved. — ED.

GEN. III.

SPEC. III.

Epanetus
hectica.More com-
monly slowly
and insidiouslyRemedial pro-
cess doubtful.Irritable
diathesis to be
combated.Acids as
sedatives and
tonics.Occasional
aperients,Myrrh the only
stimulant to be
ventured upon.The lighter
bitters useful
with acids.Bark, harmless
but of no avail.Bath waters
where the cause
is local.

GENUS IV.

ENECIA.

CONTINUED FEVER.

ONE SERIES OF INCREASE AND DECREASE; WITH A TENDENCY TO EXACERBATION AND REMISSION, FOR THE MOST PART APPEARING TWICE EVERY TWENTY-FOUR HOURS.

GEN. IV.

Alternated by slight fluxes and refluxes of symptoms.

Morning and evening often distinguished by fluxes, especially the latter.

Fordyce's natural evening paroxysm.

WE now enter upon the important genus of continued fevers, or those which run their course, not indeed without any change or relaxation whatever, as many of them were supposed to do formerly, and were distinguished by the term *continentes*, but with occasional and slight fluxes and refluxes, which bear the same proportions to the exacerbations and remissions of the epanetus, as these do to the paroxysms and intervals of the anetus or intermittent. When there are two tides or fluxes within the twenty-four hours, the one occurs in the morning, and the other in the evening. The last is always the most distinct; and takes place usually between five and six o'clock, which is somewhat later than the latest of the paroxysms of genuine intermitting fevers; that of the quartan, which is the latest of the whole, usually occurring before five o'clock. It should also be farther observed, that, where continued fever discovers but one augmentation in the twenty-four hours, it is always that of the evening. Dr. Fordyce attempts to show that, even in a state of the firmest health, we constantly discover some tendency to a little febrile affection every evening; this he calls the natural evening paroxysm of fever; and to this habit he ascribes the existence of an evening increase of continued fever.

The genus thus defined and characterised, includes the three following species:

- | | |
|------------------|---------------------|
| 1. ENECIA CAUMA. | INFLAMMATORY FEVER. |
| 2. ——— TYPHUS. | TYPHOUS FEVER. |
| 3. ——— SYNOCHUS. | SYNOCHAL FEVER. |

Sauvages's line of distinction between the different species of continued fever.

Holds only generally.

Sauvages draws a line of distinction between these three from their respective duration, as well as from their more essential symptoms, affirming that the cauma terminates in a week at the farthest; the typhus in two, though sometimes protracted to three weeks; while the synochus reaches beyond the second, and often beyond the third week. As a general rule, this remark is worth keeping in mind; but, the deviations from it, in all the species, are too frequent to enable us to lay hold of it in assigning their specific character.

SPECIES I.
 ENECIA CAUMA.
 INFLAMMATORY FEVER.

HEAT GREATLY INCREASED; PULSE QUICK, HARD, AND STRONG;
 URINE RED; DISTURBANCE OF THE MIND SLIGHT.

THIS species has been distinguished by a variety of names by different nosologists and other medical writers: the chief of which are, *imputrid synochus*, which is that of Galen; *imputrid continued fever*, which is that of Boerhaave; *imputrid continent*, which is that of Lommius; *sanguineous continued fever*, which is that of Hoffman; and *synocha*, which is that of Sauvages, Linnéus, Cullen, and most writers of the present day. Of these, *synocha*, for reasons stated in the comment to the Nosological Synopsis, is the worst; it has no clear or correct etymological meaning; it has been used in different senses by different writers, and approaches so nearly to *synochus*, used as extensively by most of the same writers, as to create a perpetual confusion in the minds of young students; and the more so, as the disease before us is expressly denominated *synochus* by Vogel, whilst most writers employ this term to import a different species of fever. On all which accounts, I have judged it right to exchange *synocha* for *cauma*, a term already employed for the same purpose by Dr. Young, and which, derived from, *καίω*, "uro," is etymologically significant of the character of the disease it designates. The common English term *inflammatory fever* is excellent; and is, in truth, a direct translation of the Greek term *cauma*. Dr. Fordyce denominates it *general inflammation*: by which he clearly intimates, that this species of fever bears a near resemblance to the symptomatic fever produced by the local affections, called *phlegmasiæ*, or *phlogotica*, which constitute the next order of the present class, to which the term *inflammations* is now commonly limited; but which Dr. Fordyce would distinguish by the term "*local inflammations*."

In effect, inflammatory fever and the fever of inflammations bear the same relations to each other, as the idiopathic and symptomatic hectic: in both, there may be a general or a local remote cause; but, the influence upon the constitution will be the same, whatever be the source of excitement. It has been doubted, however, whether *cauma* or inflammatory fever ever exists without a local cause; and Dr. Cullen, who does not allow that hectic fever is ever found without a local cause, distinctly affirms, that he has never seen inflammatory fever existing under the same circumstances: whence Dr. Clarke, of Newcastle-upon-Tyne, who has too much generalised the subject, has struck inflammatory fever entirely out of the list of diseases, contending, that even the term *inflammatory* ought never to be applied to fever, excepting when fever itself only exists as a concomitant of some local affection*: while

GEN. IV.
 SPEC. I.
 Distinguished
 by various
 names,

of which the
 worst is
synocha.

And hence ex-
 changed above
 for *cauma*.

Importing
 general inflam-
 mation.
 Fordyce's
 name for it.

Difference be-
 tween inflam-
 matory fever
 and fever of in-
 inflammations.

Whether it
 exists, except
 from a local
 cause.

Local cause
 various in its
 seat, as con-
 templated by
 different sup-
 porters of this
 doctrine.

* Observations on Fevers, &c. 8vo. London, 1779. Though Dr. Tweedie does not distinctly represent this fever as being essentially connected with local

GEN. IV.

SPEC. I.

Enecia cauma.

Arteritis, what.

Dr. Clutterbuck, as we have already observed, has contended, that this local cause is at all times, and under every variety of fever, an inflammation of the brain. If, however, a cause of this kind be ever fairly made out, a variety of facts, of late detection, will be far more likely to fix it in an inflammation of the arteries, the ARTERITIS of the French writers, who have recently examined the subject at considerable length, especially MM. Portal*, Dalbant, and Vaidy†; and to which Dr. Frank has, indeed, already ascribed inflammatory fever in one of its forms.‡ But the subject is still involved in great obscurity, as it is doubtful whether the change of arterial structure, which has been found after death in many cases of supposed arteritis, has been really an effect of inflammatory action. In acute rheumatism, it is probably a frequent cause or concomitant; but this is a question we shall have occasion to return to under that disease. How far either hectic or inflammatory fever may, under particular circumstances of human or atmospherical constitutions, occasionally originate from marsh or contagious miasm, it is difficult to determine; but as Dr. Cullen was peculiarly desirous of reducing all fevers to these two sources; and as, to say the least, they are not obvious sources of either of the diseases in question, his mind appears to have received some bias from this fact in rejecting them from the list of idiopathic fevers. And as it has already been shown, that this decision has laid a foundation for much of that "tug of war" in which many distinguished members of the profession have of late years been engaged, respecting the nature and treatment of particular species of fever, it is highly probable, also, that several of the more recent hypotheses, concerning its proximate cause, have originated from the same spring.

History of symptoms.

Inflammatory fever, as it has often occurred in the author's own practice, and in that of others who have described it, usually commences with the symptoms of an acute ephemera, and may in fact be contemplated as the same disease running on from four or five to about eleven days, without intermission, or a renewal of the cold fit. It commences with a sense of languor and inaptitude for exertion, with a disrelish for food, which continues for a day, or perhaps two. There is then chilliness and soreness over the surface, with nausea, and headach, succeeded in the evening by a great increase of heat, and at night by perspiration, with great thirst, restlessness, and sometimes delirium; sometimes in young persons, convulsions with a stupid drowsiness. The bowels are usually costive, the urine high-coloured, and the pulse quick and hard.

Pathognomonic symptom, hardness of the pulse.

With Dr. Fordyce, the grand pathognomonic symptom of cauma is hardness of the pulse. This accompanies it from first to last, in its simplest and in its severest state. When the disease is

inflammation, as a cause, he observes, that "it is necessary to bear in mind the local inflammations which almost invariably arise in the course of these acute fevers, and the effect of such complications on the febrile symptoms." See Dr. Tweedie's Treatise on Continued Fever, and its Modifications, p. 49. 12mo. Lond. 1832. — ED.

* Cours d'Anatomie Médic., tom. iii. p. 127. 1804.

† Dict. des Sciences Médicales: Journ. Complément., vi. Août, 1819.

‡ De Curandis Hominum Morbis Epitome, lib. i. § 118. 8vo. Manheim. 1791.

mild, it is hard alone; when more violent, it is at the same time full, strong, and frequent. The obstructed pulse is often confounded with the hard, and it is not easy to distinguish them without considerable practice. There is rigidity of resistance to the finger in each, but of a different kind. In the hard pulse, it is much firmer and tenser; and is supposed by Dr. Fordyce to result from such an increase of arterial contraction as to overbalance its correspondent dilatation. It indicates, in his opinion, a very high degree of living power, and is peculiarly characterised by a tardy coagulation of the blood when drawn freely into an hemispheric basin, in consequence of which the red particles have time to subside, and leave the surface colourless, or with a buffy appearance. In the obstructed pulse, on the contrary, the blood coagulates at once; and, the red particles not having time to separate, the surface is of the same hue as the cake below.

The disease sometimes terminates abruptly with a critical sweat, or some other evacuation, on the fourth or fifth day; but more usually increases in violence, though with occasional declinations, for a week longer; during which time the pulse rises to a hundred, or a hundred and ten strokes in a minute, but continues regular; the nausea subsides, and the patient will take and retain whatever is offered to him of simple nutriment or medicine: the thirst is less violent, but the tongue is deeply furred, and the lips are parched.

The disease is not often dangerous; and about the eleventh day gradually subsides, or yields to some critical discharge, which is usually that of a free and alleviating perspiration. The pulse soon sinks to eighty, and the chief symptom is weakness.

During the course of the fever, every organ suffers from its morbid and increasing impetus; but they do not all suffer alike: for in some parts there is, occasionally, a greater resistance to the flow of the circulating fluid than in others, whence that acute pain, which is often complained of in the head or the side: in the latter case, sometimes amounting to pleuralgia. And, not unfrequently, the vessels of one part will give way more readily than those of another, and there will be a sense of heaviness and oppression in the head, the heart, or the lungs; as though some effusion had taken place, which, in some instances, is perhaps actually the case. If the head be much affected, delirium is a frequent result, with ravings and violence, rather than the low muttering incoherence of asthenic fevers.

From the history, already given of the malignant causus, or ardent malignant remittent, it appears probable, that inflammatory fever may sometimes be produced from febrile miasm, though it is commonly derived from other sources. Of these, the stimulus of violent passions is, perhaps, one of the most common; and especially upon a vigorous and plethoric habit, which is the usual temperament in which inflammatory fever makes its appearance. Undue muscular exercise, heating foods, or excesses of any kind in the same habit, are also frequent causes; while another may be found in the suppression of any accustomed discharge, as that of menstruation, epistaxis, or periodical blood-letting. Suddenly suppressed perspiration is, in like manner, a frequent, perhaps the

GEN. IV.

SPEC. I.

Enecia cauma.

Hardness of the pulse described and explained.

How differs from obstructed pulse.

Progress of cauma.

Termination.

Different organs differently affected.

May sometimes, perhaps, arise from febrile miasm; but more frequently from violent passion, exercise, or heating foods; suppression of accustomed discharges, or sudden perspiration.

GEN. IV.

SPEC. I.

Enecia cauma.

Whether by a
resorption of
bile.

Inflammatory
fever a fre-
quent concomi-
tant of resorbed
bile,

but perhaps
never produced
by it.

Produced by
vermices in the
frontal sinus.

most frequent cause of any; especially when the body is very hot, and the change is effected by exposure to a temperature of great cold, applied externally or internally, as that of a current of cold air, a large draught of cold water, or plunging into a river.

Some writers, as Sennert and Chrichton, have supposed inflammatory fever to be occasionally produced by an absorption of bile into the blood-vessels under the excitement of a tropical sun, or of a torrid summer in milder regions; and they suppose that the bile is, in this case, possessed of a more than ordinary degree of acrimony, and that the symptoms are varied by a more pungent heat and more intolerable thirst, with a more scanty secretion of urine, preternaturally acrid and high-coloured.

That bile of this description is often forced back into the system under the circumstances here supposed, is unquestionable; as it is also that inflammatory fever is a frequent accompaniment of this morbid change. But, notwithstanding the above authorities, such fever seems less attributable to the reflux of bile into the blood, than to the insolation or solar excitement; which, by unduly stimulating the liver, has been the cause of an overflow of bilious secretion. How far a more irritant or exalted acrimony may be communicated to bile thus operated upon, or what may be its effect upon the system, admitting it to take place, it is difficult to determine; but there is much reason to doubt whether genuine bile in the sanguiferous system is ever a cause of fever, or stimulates the heart or arteries to increased action. For if this were the case, jaundice would always be accompanied with inflammatory fever. Instead of which, however, we find it accompanied with atony instead of entony, or diminished, instead of increased power.

Sauvages gives a case, in which inflammatory fever was produced by a mechanical irritation of the meninges of the brain, by a lodgment of vermices in the frontal sinus, of which seventy-two were discharged during a fit of vomiting and sneezing, from which time the patient began to recover.

These vermices were most probably the larvæ of some species of the cæstrus or gad-fly, which had crept up into the frontal sinus, after being hatched in the nostrils in which the parent insect had deposited her minute eggs. This is a very common affection in grazing quadrupeds, and especially in sheep, which are often peculiarly tormented, and sometimes driven almost mad by the violence of the irritation.

Stoll gives a case in which the brain, on examination after death, was found deluged with serum—*diluvium serosum*.* But such an appearance is rather to be regarded as an effect, than a cause of the disease; as an instance of *cephalitis profunda*, in consequence of the brain having suffered more, than any other organ from the inflammatory impetus.

Hence the following varieties are noticeable under the present species:

α Plethoricum.

Plethoric inflammatory
fever.

Produced in a plethoric habit by great
mental or muscular excitement, or
heating foods; or by a sudden sup-

* Mat. Med., III. p. 294.

| | | |
|--|--|--|
| | pression of perspiration, or of other accustomed discharges. | GEN. IV. SPEC. I. <i>Enecia cauma.</i> |
| β Biliosum. Bilious inflammatory fever. | Accompanied with an excessive secretion of bile, absorbed into the sanguineous system. | |
| γ Pleuriticum. Pleuritic inflammatory fever. | Accompanied with a violent stitch or pain in the side. | |
| δ Cephalalgicum Cephalalgic inflammatory fever. | Accompanied with acute pain in the head. | |

As an inflammatory diathesis constitutes the essence of this fever, the cure must depend altogether upon a reduction of the vascular, and especially of the arterial entony: always bearing in mind the possibility, that the disease may suddenly lose its inflammatory character, and rapidly pass into that of a typhus. Regulated by this view, we should generally commence with bleeding and cooling purgatives. There are a few cases, indeed, in which bleeding may be dispensed with, as when the habit is by no means plethoric, and the pulse is obstructed rather than hard; but these are cases that rarely occur. Diaphoretics, or relaxants, as they are denominated by Dr. Fordyce, may then be employed with advantage. Of these the tartarised antimony, the antimonial powder, or James's powder, are chiefly to be relied upon; and may be given alone, or, which is often better, in saline draughts; and particularly those formed of the acetate of ammonia. And it may not be amiss to observe here, that the acetate of ammonia is sometimes prepared in the form of crystals, and sits more easily on the stomach in this, than in any other shape. When given as a liquid, it is of importance, that the solution should retain the carbonic acid gas of ammonia as largely as possible; and, for this purpose, the union should take place in a strong close vessel. According to Bergman, nearly half the weight of ammonia depends upon the quantity of this gas which it contains: so that in a pint of the solution of the acetate of ammonia, comprising four drachms of the latter, there will be extricated, if made in the manner here recommended, little less than a hundred and sixty cubic inches of air.

Remedial process.
Venesection.
Cathartics.

Relaxants.

Crystallised acetate of ammonia.

As the stomach is for the most part but little affected, emetics, if used at all, can only be employed for the purpose of determining to the surface; but, as we can do this by the antimonial and other diaphoretics just referred to, as also by diluent drinks, it is hardly worth while to irritate the stomach in order to accomplish the same purpose. Perfect rest of body and mind, a reclined position, and a light liquid diet, destitute of all stimulants, are also indispensable toward recovery. The air should by all means be kept pure, by being constantly renewed, though without a sensible current; the temperature cool; the clothing light, and as often changed as may be necessary to maintain cleanliness; and the beverage, toast-water, lemonade, or cool tea.*

Treatment.

Emetics, how far useful.

Other remedies.

* Our author has here omitted all notice of cold affusion, the advantages of which, in the acute or inflammatory forms of fever, have been acknowledged by almost every writer. The effect of it is to diminish the heat of the body, to

GEN. IV.

SPEC. I.

Enecia cauma.

Inflammatory fever less common than formerly;

as conjectured by Mr. Hunter.

After all, however, it is not often that examples of pure inflammatory fever are to be met with in the present day; and it is contended by very high authorities, and seems to be established by the medical records of earlier times, compared with those of our own, that it is a disease far less common now than it was formerly; and that it is seldom, to adopt the words of Mr. J. Hunter, "that physicians are obliged to have recourse to the lancet, at least to that excess which is described by authors in former times. They are, now, more obliged," continues the same writer, "to have recourse to cordials, than evacuations; and, indeed, the diseases called the putrid fever and putrid sore throat are but of late date. I remember when the last was called Fothergill's sore throat, because he first published upon it, and altered the mode of practice. I remember when practitioners uniformly bled in putrid fevers; but signs of debility and want of success made them alter their practice. Whether the same difference takes place in inflammation, I do not know, but I suspect that it does in some degree; for I am inclined to believe that fever and inflammation are very nearly allied, and that we have much less occasion for evacuations in inflammation, than formerly; the lancet, therefore, in inflammation, and also purgatives, are much more laid aside."*

Treatment.

Whether owing to a change in the common mode of life.

It is not easy to account for this change in the national temperament. It is common, indeed, to ascribe it to an alteration in our mode of life, which is asserted to be much fuller than that of our forefathers. "We may be said," says Mr. Hunter, "to live above par. At the full stretch of living, therefore, when disease attacks us, our powers cannot be excited further, and we sink so as to require being supported and kept up to that mode of life to which we have been accustomed."

lower the pulse, and to bring on perspiration and sleep. As a general rule, the sooner the affusion is applied after the irregular chills of the first stage are over, the better, provided the heat of the skin is steadily above the natural standard. Dr. Currie deems the safest time for it to be that when the exacerbation is at its height, or immediately after the commencement of its declination. At this period the heat rises one or two degrees in the central parts of the body, and still more in the limbs. Dr. Currie, therefore, generally directed affusion to be employed between six and nine o'clock in the evening. It is never to be resorted to when any considerable sense of chilliness exists, notwithstanding the thermometer may indicate an augmented temperature of the body. Neither ought it to be adopted when the heat, measured by the thermometer, is less than, or only equal to, the natural heat; nor when the patient is perspiring profusely. Dr. Tweedie informs us, that he has never seen a single case in which cold affusion succeeded in cutting short the fever, though all the patients so treated felt afterwards greatly relieved. He sets down the practice as best adapted to inflammatory fever (synocha), and more especially to the fevers of hot climates, which are accompanied by much greater excitement than those of temperate countries. He advises the practitioner, however, to ascertain, in every case, before such a powerful remedy is administered, that there is no visceral inflammation; "were such a powerful shock given to the system under these circumstances, dangerous and even fatal consequences might ensue." On account of these reasons, and the manner in which most patients object to cold affusions, Dr. Tweedie prefers sponging the surface of the body with cold water, or vinegar and water. In winter the fluid used may be tepid, if more agreeable to the patient. See Dr. Tweedie's Treatise on Continued Fever and its Modifications, p. 187. et seq.; also Dr. James Currie's Med. Reports on the Effects of Water, cold and warm, as a Remedy in Fever. 8vo. Liverpool, 1798. — Ed.

* On Blood, &c. part ii. p. 227.

If this be a correct view of the times in Mr. Hunter's day, they have greatly altered and improved within less than half a century; for there has never been a period, since wines and fermented liquors have been introduced among us, so temperate and sober as the present. Drunkenness, which was formerly common in our streets, is now rarely met with; suppers are almost entirely relinquished; and, instead of its being disgraceful, as was the case in "the olden time," for the master of the house to let his guests leave him either sad or sober, nothing is now so disgraceful as intoxication. It is true, we are got back again to a very free use of the lancet in many instances; which would seem to show, that we had completed a revolution in our general temperament, as well as our general temperance; but it is not a little singular, that, while the lancet is still used with comparative caution in inflammatory fever, it is chiefly employed, and often unsparingly, in typhus or putrid fever. And hence, there is more reason, I fear, for suspecting a revolution in the professional fashion, than in national temperament; and that the bold and the timid plans have been alternately introduced, and alternately dropped, not so much from any radical change in the constitution, as from their being found to fail, because employed as popular means, or under the influence of some favourite hypothesis on all occasions, without a due degree of clinical discrimination, or attention to the habits or symptoms of individuals at their bed-side.

GEN. IV.
SPEC. I.
Enecia cauma.
The habits of the day do not answer to his description.

SPECIES II.

TYPHUS.*

TYPHUS FEVER.

PULSE SMALL, WEAK, AND UNEQUAL; USUALLY FREQUENT;
HEAT NEARLY NATURAL; GREAT SENSORIAL DEBILITY, AND
DISTURBANCE OF THE MENTAL POWERS.

THE term is derived from Hippocrates, who uses it, however, in a sense not exactly parallel with its application in modern times, but rather in reference to that low, muttering, and stupid delirium, which so frequently accompanies the disease. It is, nevertheless, admirably expressive of the general nature of the fever to which it was applied at first, and which it designates at present; which burns, not with open violence as the cauma, but with a sort of concealed and smothered flame; for the Greek term *τύφος* signifies "to smoulder," or "to burn and smoke without vent."†

Any of the ordinary causes of fever may be a cause of typhus; for the typhoid form is often dependent upon the character of the

GEN. IV.
SPEC. III.
Specific term derived from Hippocrates, and peculiarly expressive of the disease.

* "A peculiar form, or type of fever, characterised by the more early and severe affection of the brain and nervous system; by the more constant changes which the mucous membranes undergo; by affection of the cutaneous and glandular systems; and, in the advanced stage, by great prostration and symptoms denoting putrescence." Dr. Tweedie on Continued Fever, p. 76.

† The name of this fever is sometimes believed to be derived from the Greek word, *τύφος*, signifying stupor. — ED.

May originate from the ordinary causes of fever.

GEN. IV.
SPEC. II.
Typhus.

constitution into which it is received, as evincing a great deficiency of sensorial power: and hence cold, mental agitation, excess of muscular labour, and even intemperance, which, in a high entonic habit, might generate synocha or inflammatory fever, will often in a debilitated constitution, and especially when the debility depends primarily upon the state of the nervous system, and the nervous influence is recruited with difficulty, give a typhous complexion to the disease from the first.

But arises generally from human efflu-
vium, under the influence of auxiliary powers.

But, though all the causes of fever may in this way give rise to typhus, its common cause, as we had occasion to notice when treating of the remote causes of fever*, is febrile miasm, issuing from the decomposition of human effluvi-um, under the influence of the ordinary auxiliaries of a close and stagnant atmosphere; still farther corrupted by a load of foreign exhalations from dirt or filth of any kind, and of that degree of warmth and moisture which must always exist where society exists, and especially where it exists in too crowded a state. Under these general circumstances, a very low degree of warmth and moisture is sufficient, though there must be some proportion of both. And, provided there be an adequacy of warmth, the lower the temperature, the more certainly an individual becomes affected; not from a more abundant generation of febrile miasm, or from its being more volatile,—for, on the contrary, it is here perhaps less abundant, and even less volatile,—but from the more depressed state of the living power, and the less resistance it is capable of offering to any morbid influence whatever.

Miasm thus generated has a specific power of lowering the vital energy.

I have just remarked, that, under a depressed state of the living power, whatever be its cause, whether a want of cheerful warmth, cheerful passions, cheerful food, or cheerful and regular habits, typhus is often more likely to take place, than any other species of fever. But when febrile miasm, produced by a decomposition of effluvi-um from the living body, exists in co-operation with these, it is almost impossible for an individual to escape; as the miasm thus generated has a specific power—a power beyond all other febrile causes whatever—of lowering still farther the vital energy as soon as it is received into the system, and thus of confirming the previous tendency to this peculiar type.

In what way typhus becomes contagious.

All this, indeed, has been observed already, though it is necessary to revert to it on the present occasion: it has also been farther observed that, when a typhus has, in this or any other manner, once arisen, the effluvi-um from the living body during its action is loaded with miasm of the same kind, completely elaborated as it passes off, and standing in no need of the decomposition of the effluvi-um for its formation. In many cases, indeed, all the secretions are alike contaminated; and, hence, febrile miasm is often absorbed, in dissection, by an accidental wound on the hand, and excites its specific influence on the body of the anatomist; for in this way, also, typhus has been produced.

The contagion more limited in its range than marsh-miasm.

Hence, typhus becomes infectious; but as the miasm it generates, though more suppressive or exhaustive of sensorial energy, is less volatile, than that of marsh-lands or dead organised matter, its infectious power is confined to a much more limited atmosphere, than that of fevers arising from this latter source. And, on this account, fevers originating in jails, or other confined and crowded

* Suprà, cl. I. ord. I.

scenes, are less extensively communicable, than the yellow fever, or that of hot climates and exhaling swamps.

It may be also necessary to remind the reader of another remark already made, that, in a pure atmosphere, the miasmatic materials, from whatever source derived, become dissolved or decomposed; but this happens slowly and with great difficulty, perhaps not at all, in a vitiated atmosphere, already saturated with foreign corpuscles. In a state thus crowded, moreover, they less readily disperse or ascend beyond their proper periphery of action; and where they are less volatile, as when issuing from human effluvium, they perhaps adhere by a peculiar tenacity to bodies more ponderous than themselves, and thus loiter for a still longer period within the stratum of human intercourse. And hence, the fouler as well as the more stagnant the atmosphere, the more general, and, from the former cause, the more malignant, the disease; for, as nothing is so contributory to the preservation of sound health as pure air, so nothing tends so much as foul air to prolong or aggravate diseases of every kind. And hence, again, we have an obvious and sufficient reason, why typhus should become more severe in proportion as it spreads and impregnates a given space with its specific miasm and accompanying colluvies.

To what extent febrile miasm, issuing from the source before us, may spread in a free influx of pure air without becoming dissolved, or, in other words, so as to retain its contagious power, has never been very accurately ascertained. We know, however, that its range is very circumscribed, and reaches to but a very small distance from the patient, or the nidus of foul clothes or utensils in which it may be lodged; and never infects a person in an adjoining street, or house, or room in the same house; nor even, as Dr. Haygarth has observed, in the patient's own chamber, if large, airy, and kept clean: a remark that has since been confirmed by Dr. Baillie. "With respect," says he, "to the contagious nature of these fevers, I am convinced, that it is in general not considerable. I do not recollect an instance in which a patient in that hospital (St. George's) communicated the infection to a patient lying in the next bed. When patients are crowded together, and the apartments are ill-ventilated, I entertain no doubt of this species of fever being capable of being communicated from one individual to another."* [Dr. Alison, in his description of the epidemic fever of Edinburgh, in 1827, likewise particularly mentions, that, in the men's ward of the hospital, there was no instance of any patient, admitted on account of other complaints, taking fever in the house, notwithstanding its continued presence on the opposite side of the ward. In the women's ward, however, two or three patients, admitted on account of other complaints, took fever. Notwithstanding what happened in the men's ward, this intelligent physician adduces many convincing facts, in support of the doctrine, that fever spreads, not from malaria, but from contagion communicated by intercourse between the healthy and the sick.†]

It is also of great importance to know, that typhous miasm, like the specific miasms of exanthems, does not render clean clothes of any kind contagious; or, in other words, does not adhere to, or

GEN. IV.
SPEC. II.
Typhus,
Becomes dissolved in a pure atmosphere, but often not at all in a vitiated.

Why more malignant in vitiated air.

Its contagious range not fully ascertained, though known to be very circumscribed.

Does not render clean clothes contagious, but unquestionably unclean.

* Lectures and Observations on Medicine. 1825. Unpublished.

† Alison, in Edin. Med. and Surg. Journ., No. xciii. p. 234. et seq.

GEN. IV.
SEC. II.
Typhus.

All individuals
do not equally
receive the
contagion.

What propor-
tion of indi-
viduals are
naturally exempt
from its in-
fluence.

Miasm con-
tinues latent in
the body seven
days, and some-
times much
longer.

Latent stage
often very
short.

harbour in them. When, however, they are not clean, they may unquestionably be rendered contagious; and, hence, it is probable, that the animal filth, with which they are impregnated, while it is a source of additional miasm, becomes a fomes of that already formed, and separated from the patient's body.

A susceptibility, however, to diseases of every kind varies considerably in different individuals; and hence many persons, upon an equal exposure to typhous contagion with others, receive it far less readily; and, in some cases, seem to be almost favoured with a natural immunity. As we have already remarked, that a peculiar state of body gives a peculiar tendency both to generate and receive typhus we can easily conceive that, where the body is in an opposite state, it must be much less susceptible of its influence; and we are thus put in possession of a general cause of escape. But there seems to be something beyond this, dependent, indeed, not upon the incidents of more vigorous health, or higher animal spirits, but upon the nature of the idiosyncrasy itself.

Dr. Haygarth has endeavoured to determine, from very ingenious and plausible data, the average proportion of those who in this manner remain exempt from contagion, while spreading on every side around them. And he limits the immunity to one in twenty-three; for he tells us that, when one hundred and eighty-eight men, women, and children, were exposed fully to the typhous contagion for days and nights together, in small, close, and dirty rooms, all of them, except eight, were infected with this fever.* And he has farther endeavoured to show that the miasmatic poison, when received into the body, continues in a latent state for seven days, from the time of exposure to the contagion, before the fever commences, and may continue in the same state for seventy-two days, beyond which we have no instance of its producing any effect. And this deduction is in pretty close unison with the experience of Dr. Bancroft†, who, in ninety-nine cases of orderlies and nurses that attended the English army, on its arrival at Plymouth from Corunna, in 1809, observed that they were rarely attacked with fever earlier than the thirteenth, and, in no instance, later than the sixty-eighth day. [In numerous instances, however, brought forward by Dr. Marsh‡, the latent period of typhus, or the interval

* Letter to Dr. Percival, p. 31.

† Essay on Yellow and Typhus Fevers, p. 515.

‡ See Marsh on the Origin of Fever. Dublin Hospital Reports, vol. iv. p. 456., &c. Dr. Elliotson never saw an instance in which typhus fever showed a contagious character (Med. Gaz., 1832, p. 146.); nor has the editor of this work ever noticed the occurrence even in the great prisons which he has now attended more than seven years. No doubt, however, where many cases of severe fever are brought together, and the effluvia from the patients concentrated, the disorder will sometimes assume a very infectious nature. The records of the Fever Hospital seem to leave no doubt of typhus being contagious under certain conditions; for every medical officer, every servant there, and every person employed in washing the linen of that institution, have all had typhus. Some have had it more than once, and others have died. Yet, nothing of this kind has happened at the Small-pox Hospital, which is on the very same spot. And, as Dr. Elliotson remarks, this fact is very important, as clearing up the point, whether all these persons have had it through the emanations of the patients in the Fever Hospital, or through the situation. The following passage from Dr. Elliotson's lectures is highly instructive:—"You will find an argument against the contagion of typhus fever adduced from this circumstance, that it will sometimes disappear during an extreme temperature, and it will

between the receipt of the contagion and the beginning of the symptoms, was a very short period; and the infection taken so instantaneously, as it were, that doubts arose, whether the contagion had had time to operate through the medium of the absorbents.]

Man is so much the creature of habit, that his constitution is, in a thousand instances, brought by degrees to endure poisons of the most fatal power. This we see daily in the use of opium and ardent spirits; and we shall in due time have to notice something of the same kind, even in plague. This adaptation of the constitution, however, to the circumstances by which it is surrounded, is in nothing more conspicuous than in the fever before us. Not, indeed, in all persons, — for all do not possess the same pliability of constitution, — but in those who are endowed with it. And, hence, one reason why nurses, and perhaps hospital-surgeons, escape so often without injury, and especially why prisoners, brought into a court for trial, remain themselves occasionally in perfect health, while their clothes are so impregnated with the contagious miasm as to infect a whole court, and communicate the disease to the judge or others who are at the greatest distance from them; of which we are furnished with melancholy examples in the Oxford assizes of 1577, those at Exeter and Taunton in 1586, those of the Old Bailey in 1736 and 1750; besides similar instances in various hospitals and ships of war.

There are other persons again, as Sir George Pringle has well observed, whose constitutions, forming a middle line between those who readily receive, and who powerfully resist, the contagious aura, are affected only in a modified degree. They bend to the assault, but are not cut down by it. They become feeble and irritable; the sleep is disturbed; the tongue white in the morning; the appetite impaired; the smallest exertion fatigues them, and accelerates the pulse; and, in this state, they remain for weeks together, and at length recover without any formal attack of fever.

sometimes disappear altogether, without any obvious reason; whereas, if it were contagious, it is argued, it would spread from one to another, till all, or the greater part, had suffered from it. It is said, that it is only a disease which depends upon a particular state of the atmosphere, and not upon an emanation from a diseased person; and that, therefore, it is suspended by the extremes of temperature, or will suddenly cease, without any obvious reason. It is, indeed, true, that non-contagious yellow fever, and intermittent and remittent fevers, and other diseases decidedly not contagious, will be aggravated or repressed by extremes of temperature, and by causes not discoverable. But this is exactly the case, not only with typhus fever, but with diseases which all people of common sense allow to be contagious. Epidemic small-pox is frequently checked by extreme cold. The plague, which, I believe, almost every body allows to be a contagious disease, in the strict sense of the word, — *not infectious*, but *contagious*, — is also stopped by extreme heat or cold. Small-pox is frequently so stopped, and likewise by the wind called *harmattan*, which also arrests the plague; and, what is curious, this wind will prevent persons from taking the small-pox, even if they be inoculated. Hooping-cough and measles, which most persons allow to be contagious, are generally checked at the height of summer; and Sydenham says, that scarlatina is most prevalent when the summer is over." If such, and some other irregularities, will occur in the case of diseases known to be contagious, there is no reason at all to doubt that typhus fever is contagious, merely because it will suddenly cease in a district, without our knowing why, or because it is apparently arrested by atmospheric change. See Elliotson's Lectures, delivered at the London University, published in Med. Gaz., 1832, p. 147. — Ed.

GEN. IV.
SPEC. II.
Typhus.

Man may be brought by habit to bear exposure harmlessly.

But not all persons equally.

Examples.

Some more slightly affected than others;

GEN. IV.

SPEC. II.

Typhus:

in yellow fever
as well as in
typhus.

Typhus some-
times produced
from swamps,

and then occa-
sionally epi-
demic.

Occurs chiefly
in low tem-
peratures.

We have seen that the same influence of habit exists under yellow fever; during which the natives of those climates where its remote causes are in almost perpetual operation suffer far less when it attacks them, and are far less susceptible of its attack.

But, though febrile miasm, issuing from a decomposition of human effluvium, has a peculiar tendency to generate typhus, we have seen that the same miasm, issuing from a marsh effluvium, or a decomposition of dead organised matter, under a peculiar state of modification, has produced remittents with a typhous character, and sometimes specific typhus itself.* And as, in this case, the miasm is apt to spread more widely, typhus has, by many writers, been said to be occasionally epidemic. When, however, the disease issues from this source, it is far more generally in temperatures too low than too high and heated; since, as already observed, cold, and especially cold and moisture, have a peculiar tendency to depress the living power; and hence this disease is said to be almost stationary at Carlsrone, or at least to have lingered there for four or five years on some occasions.†

[The opinion, that the type of fever has not an exclusive connection with its cause, and that it depends much upon atmospheric influence, or constitutional diathesis, is supported by Dr. Marsh‡, who cites several cases in which exposure to typhoid contagion was believed to have occasioned intermittent and remittent fever; and to puerperal infection, typhus.]

Typhus, therefore, originating from different causes, and all these causes modified in their action by collateral circumstances, may readily be supposed to be accompanied with very different symptoms, and to appear under very different degrees of severity. The chief varieties, however, are the two following:

α Mitior.

Nervous fever.

β Gravior.

Putrid fever.

α E. Typhus
mitior.

Character.

The FIRST VARIETY, OR MILD TYPHUS, was called by Dr. Huxham *febris lenta nervosa*, and has hence been commonly distinguished by the name of low or slow NERVOUS FEVER, from the great languor and dejection of mental or sensorial power with which it is always accompanied, and, on this account, it has sometimes been denominated *hysterical fever*.§ It is particularly characterised by slight shiverings; heavy vertiginous headach; oppression at the præcordia; nausea; sighing; despondency; coma, or quiet delirium; whey-like urine.

Sporadic
typhus gene-
rally under
this form.
Progress of
the disease.

When the disease appears sporadically, it is usually under this form. There is nothing alarming to the patient's friends on its accession. The first symptoms are slight, the tongue exhibits little change, and the pulse is only a little quickened and somewhat smaller than usual: at the same time, however, there is great anxiety and depression of mind; so that the symptoms do not much differ from a mild, and comparatively insignificant, fever of any kind, operating upon a nervous temperament. But, as the

* Epanetus malignus asthenicus, suprâ, cl. III. ord. I. gen. III. spec. II. 2.

† Foxe, Neuen Schwed. Abhandl. Band. viii.

‡ See Dublin Hospital Reports, vol. iv. p. 519. et seq.

§ Manningham on the Symptoms, Nature, and Cure of the Febricula, commonly called the Nervous or Hysterical Fever. Lond. 1776.

disease advances, all the symptoms of sensorial debility become severer; the skin, which has hitherto been mostly dry, will, about the third day, be covered with profuse, clammy, debilitating sweats, while the heat is still inconsiderable, and the countenance pale and sunk. The sweat is often offensive to the smell, frequently acid, and sometimes, according to Stoll, as sour as the sharpest vinegar.* About the tenth day, the weakness greatly increases; all the limbs tremble; and the tremors soon become convulsive, with a despondency and alienation of mind, at first observable only in the night, but soon continuing with little intermission: the delirium is of the mild or quiet sort, and rarely amounts to phrensy.

The disease often runs on to the twenty-first day, and, occasionally, to a much longer period. It is seldom marked by that sudden change which can be called a crisis; but gradually becomes more aggravated in its symptoms, till it reaches a fatal termination; or slowly advances to convalescence, by evincing a disposition to natural sleep; more steadiness and firmness of pulse; a more favourable countenance; a tongue more florid at the edges; a firmer and more collected mind, and a returning desire for food, often, indeed, capricious, but without nausea or sickness.†

In an anomalous and very singular case related by Dr. Satterley ‡, the desire for food, which at first was greatly loathed in whatever form offered, re-appeared about the fifth day with an enormous craving which it was impossible to satisfy. Animal food was preferred, but food of any kind was swallowed voraciously; and, when food was not allowed, various indigestible substances were devoured in its stead. This desire returned with every returning ingravescence of the fever, which adhered to no regular period, and it continued as long as the ingravescence lasted, which was usually ten or twelve hours. The disease extended with numerous variations to upwards of thirty days, when the fever unequivocally subsided, and the patient gradually recovered.

Of the treatment we shall speak, after considering it in its severer forms.

The heavier, severer, or *PUTRID TYPHUS* chiefly differs from the mild in the violence and rapidity of its march, and the marked and undisguised character it assumes from the first. While the mild therefore commences insidiously with only slight shiverings, the heat scarcely above the natural temperature, and the pulse small, and only a little quickened, the heavy typhus opens with sensible

GEN. IV.
SPEC. II.
α E. Typhus
mitior.

Rarely marked
by a crisis.

Termination.

Singular case
of typhus.

β E. Typhus
gravior.

How differs
from mild
typhus, or ner-
vous fever.

* Rat. Med., iii. p. 79.

† The following are some of Dr. Tweedie's observations on this fever:—"In typhus mitior the febrile symptoms are mild, though it is evident, from the intellectual disorder and prostration, that the nervous system is much affected. Probably, at the commencement, there is no inflammatory action in the brain, the whole of the phenomena, viz. great languor, feeling of debility, muscular prostration, soft feeble pulse, giddiness, intellectual dullness, and transient delirium, being the result of the peculiar operation of the febrile causes on the nervous system. Sub-acute inflammation of the brain often supervenes on this condition of the nervous system; and, when this takes place, the more prominent symptoms of cerebral inflammation are recognised; and to the difference in the intensity of the cerebral affection, may be traced the infinite variety of nervous symptoms, which individual cases present." See Tweedie on Continued Fever, p. 80.—Ed.

‡ Med. Trans., vol. v. art. xxii.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.

Called also
jail, camp, and
hospital fever.

Spotted fever.

Petecchial or
punctular
fever.

Diagnostics.

Why regarded
by Hildenbrand
as an exanthem.

and alternating rigor and heat, succeeded by little or no perspiration; the pulse is tense and hard, usually quick but fluttering; with pain over the forehead and crown; urine alternating from limpid to turbid; delirium succeeded by stupor; purple dots or patches, and other early signs of putrescency.

From the last feature, the disease has derived its common name of PUTRID FEVER; as it possesses the additional names of JAIL, CAMP, and HOSPITAL FEVER, from its appearing so frequently in these situations: while, from the purple or flea-bite spots, which last are often called petechiæ, or as it should rather be written petecchiæ, this variety has been very generally treated of at home, under the name of SPOTTED FEVER, and on the Continent under that of *febris petechialis*, or *petechizans*; sometimes, as by Follini * and Matarasius †, under that of *febris peticularis*; sometimes, as by Jacobi and Morelli ‡, that of *febris purpurata*; while by A. Castro it is termed *febris punctularis* §; and by De Cermona, *febris cum punctulis*. || By the Spaniards, it was hence vulgarly denominated tavadillo or tabardillo, from tavarado, a spotted cloak formerly in common use. It is a termination very common in various parts of America. These punctæ or vibices, however, are nothing more than symptoms of putrescency; and are common to other fevers, and even to diseases without fever, as land or sea scurvy (*porphyra hæmorrhagica* and *p. nautica*) as well; and hence are no ground whatever for establishing a distinct species, and still less a distinct genus, though they might perhaps form a variety. By most writers therefore of eminence, from Cullen to Swediaur, they are arranged and treated of as different forms of the same disease.

During the first twenty-four hours, the alternate heat and cold are considerable; the fever increases every evening, and, in the second week, the delirium usually commences; the stupor following five, six, or seven days afterwards. From the first, there is a heavy and vertiginous headach and vomiting: the pain over the forehead shoots through the eyes to the bottom of the orbits; the eyes themselves are full, heavy, and slightly inflamed; the countenance is bloated; the tongue white rather than furred; the temporal arteries throb, while the pulse at the wrist is small and oppressed; the ears tingle; and the mind, antecedently to the delirium, is fearfully dejected. There is also occasionally, from the weak degree of action on the surface, a livid but interrupted turgescence over the whole of the body, as well as the face, not unlike the mottled appearance on the skin of a healthy person when exposed to a slight degree of cold. Dr. Hildenbrand has regarded this symptom as constant and pathognomonic; and has hence introduced contagious typhus into the list of exanthems, specifically distinguished by this spotted efflorescence ¶, which he seems further to believe is loaded with its peculiar miasm. So far, however, as the present author has seen, it is an occasional, rather than a

* Orationes de Naturâ Febris Peticularis. Colon. 1722. 8vo.

† De Febris peticularibus malignis, contagiosis, &c. Mezarini, 1722. 8vo.

‡ De Febre purpuratâ epidemicâ. Lion. 1641. 8vo.

§ Febris maligna punctularis aphorismis delineata. Tub. 1693.

|| Tract. de Peste et Febris cum punctulis. Sevilla, 1581. 8vo.

¶ Ueber der ansteckenden Typhus, von J. V. Edler von Hildenbrand, &c. Wien, 1815.

necessary accompaniment, and appears to be a natural result of the cause just stated. It subsides in a few days.

The balance of the sanguiferous system is generally much disturbed, from a greater degree of sensorial debility in some organs than in others; and hence, the blood is determined irregularly, and accumulation, effusion, and inflammation are frequent effects. These show themselves chiefly in the head, the lungs, and the liver; but there is no organ in which they may not occur; and they never can occur without danger. All the external senses evince great hebetude, and especially the hearing, so as often to amount to absolute deafness; the stupor is increased, and the speech muddled, while the patient appears to dream without being asleep, and talks deliriously; thus evincing the typhomania of the ancients; being often unconquerably riveted to a single idea or train of ideas. And, as the nervous exhaustion increases, he is indifferent to every thing, feels little or nothing, and if he answer at all to an enquiry how he is, says he is very well.

[Typhus fever affords a striking example of the vast change produced in the secretions by disease. The fact is particularly noticed by Dr. Armstrong in his description of the state of the tongue. In typhus fever, he observes, as the lips and cheeks become dusky during its perfect developement, a peculiar secretion is besmeared over the tongue and fauces, almost as if the fibrine and albumen had been dissolved, so as nearly to resemble in its adhesive property common melted glue; the tongue itself, from the evaporation of the thinner portions of this secretion, becomes dry, presenting a varnished appearance, like that of a walking-stick; and, at a still more advanced stage, it becomes brown, and ultimately black, from an apparently carbonaceous deposit. In some fully developed cases, where the tongue is glazed, dry, and brown, and the lips and cheeks of a dusky or purple hue, the blood drawn from the temporal artery has a venous colour. The circulation of such blood within the arteries, is connected with many of the most conspicuous and curious phenomena of the advanced stage of typhus. *The cause of this remarkable change can be shown by dissection to depend upon a specific bronchitis*, the mucous texture of the bronchial tubes being loaded with dark blood, and besmeared with a copious and tenacious secretion.*]

About the thirteenth or fourteenth day, sometimes preceded by an augmented exacerbation, and sometimes without any, the fever suddenly abates, a relieving dew appears on the parched skin, and all the excretories evince the same freedom from spasmodic constriction: the tongue loses its dryness; the nostrils are moistened

GEN. IV.

SPEC. II.

β E. Typhus
gravior.Balance of the
sanguiferous
system dis-
turbed.External
senses torpid.Typhomania
of the ancients.Appearances of
the tongue in
the progress of
typhus.Dark colour of
the arterial
blood.Acme about
the fourteenth
day.

* See Armstrong's Morbid Anatomy of the Bowels, Liver, &c. pp. 8. 14. &c. 4to. Lond. 1828. According to Dr. Burne, the blood flows slowly from divided vessels, is blacker than usual, coagulates less firmly, rarely shows the buffy coat, and, in the dead body, is found black and fluid. On Typhus, or Adynamic Fever, 8vo. Lond. 1828. Dr. Clanny's observations lead to the conclusion, that the watery part of the blood increases in proportion during the progress of the fever; while the quantity of all the animal principles and salts of that fluid is lessened; and that, when the crisis has taken place, the opposite change begins, so that the blood returns to its natural condition. Supposing this statement to be correct, we must not fancy, with Dr. Clanny, that fever depends upon the derangement of sanguification, but only that the latter is one of its attendant changes.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.

with mucus, and occasionally discharge blood; the lungs pour forth a free expuition which softens the harsh glottis and the fauces; the bowels, if not loose, feel more refreshed after evacuations; and the urine is more copious, with an abundant deposit: and, to close the whole, in the elegant language of Professor Frank, “*increscunt pulsus, mollisque unda arteriam æquali rhythmō attollit: sequuntur somni placidiores, reficientes, et oblatum ægrotus cibum minùs abhorret.*” *

Symptoms of
danger.

If, however, no critical change take place about the fourteenth day, leading distinctly to an amended state, the symptoms of putridity increase both in number and degree. There is great faintness; difficulty of respiration, intermixed with deep sobs; the breath is hot and offensive; acute pains in the loins and limbs; a heat upon the skin biting and pungent, rather than burning; leaving a smarting sensation on the fingers for several minutes after touching it, and which, from this very peculiar effect, has been called *calor mordicans*. The tongue, whitish at first, is now dry, dark, livid, black, or of a pomegranate colour. The lips are furred with a black tenacious sordes; the urine becomes brown or blackish with a most offensive smell; a blackish or bilious matter is occasionally thrown up from the stomach; the skin is more or less discoloured, as just observed, with flea-bite-shaped or broad purple spots; the stools are blackish and highly fetid. Cold, clammy, colliquative sweats and convulsions, sometimes accompanied with hemorrhage from one or more organs, soon afterwards usher in death; the period of which is extremely uncertain, and ranges from the fifth to the eighteenth day, according to the malignity of the attack, the strength of the patient, or other contingent circumstances.

This variety
rarely produced
sporadically.

I have said, that the milder variety or nervous fever usually shows itself sporadically, originating from some other cause than febrile miasm in an irritable and atonic habit. Malignant typhus sometimes commences in the same way, but usually by a decomposition of human effluvium accumulated in a camp, a ship, or even a large single family, where the space is too small for the number, the habits uncleanly, and the atmosphere stagnant and unventilated. The cause is one, and the fever the same, varied alone by accidental circumstances, or symptoms, that depend altogether upon its less or greater degree of violence.

Found chiefly
among the
poor and desti-
tute, and why.

In this metropolis, therefore, malignant typhus is almost exclusively to be met with amongst the poor; and the more wretched and destitute they are, the more readily they become its prey. I cannot better illustrate its rise and progress, than by the following simple picture as furnished by Dr. J. Hunter: it is drawn from life, and will be easily recognised by every practitioner.

Picture of the
disease in a
single family.

“A poor family, consisting of the husband, the wife, and one or more children, were lodged in a small apartment, not exceeding twelve or fourteen feet in length, and as much in breadth. The support of them depended on the industry and daily labour of the husband, who, with difficulty, could earn enough to purchase food necessary for their existence; without being able to provide sufficient clothing or fuel against the inclemencies of the season. In

* De Cur. Morb. Hom. Epit., tom. i. p. 107. 8vo. Mannh. 1792.

order, therefore, to defend themselves against the cold of the winter, their small apartment was closely shut up, and the air excluded by every possible means. They did not remain long in this situation before the air became so vitiated as to affect their health, and produce a fever in some one of the miserable family. The fever was not violent at first, but generally crept on gradually; and the sickness of one of the family became an additional reason for still more effectually excluding the fresh air; and was also a means of keeping a greater proportion of the family in the apartment during the day-time; for the sick person was necessarily confined, and another as a nurse. Soon after the first, a second was seized with the fever; and, in a few days more, the whole family perhaps were attacked, one after another, with the same distemper. I have oftener than once seen four of a family ill at one time, and sometimes all lying on the same bed. The fever appeared sooner or later, as the winter was more or less inclement; as the family was greater or smaller; as they were worse or better provided with clothes for their persons and beds, and with fuel; and as their apartment was more or less confined." *

GEN. IV.
SPEC. II.
β E. Typhus
gravior.

There are a few auxiliary causes not noticed in the above faithful delineation, which seldom fail of being present, and have always a very considerable degree of influence: these are, the anxiety and dejection of mind so sure to accompany such a scene of misery, and the increasing carelessness and consequently uncleanness of person, which are equally sure to follow. And we may hence see why typhus should so frequently make its appearance in the poorest and most miserable streets of a metropolis, and be generally confined to such streets; why it should rage most extensively and most violently in times of the severest public pressure and distress; and hence, again, why it should be more common in Ireland than in England, in Dublin than in London. We also see the inestimable advantage of such establishments as Fever Houses or Infirmarys in all populous towns, when built upon the sound principles, and governed by the judicious regulations, and, I may add, superintended by the active humanity and established talents, which are so conspicuous in the Fever Hospital of this metropolis.

Causes auxiliary to human effluvia.

To describe the typhus of jails, ships, camps, and other large bodies of men, we have only to multiply the single family we have just beheld into fifties or hundreds; ever remembering, that the virulence of the febrile poison increases in power, not in a numerical, but in a sort of geometrical proportion, to the numbers by which it is fed. So that, if five patients produce a given ratio of pestilence, ten will produce, not as much again, but nearly a hundred times as much. And hence we may readily account for the fearful and deadly ravage, which this cruel scourge is well known to inflict upon a people when closely pressed together, and incapable of flying from its pestilential aura, as in crowded encampments, or a besieged and pent-up town: and especially where, as is often the case, there is considerable carnage from the casualties of war, and a deadly calm prevails for weeks together in the atmosphere. This last concomitant, indeed, gives completion to the whole, and is a heavier calamity than it is generally conceived to

Advantages of fever establishments.

Jail typhus, &c. only a complex enlargement of the above picture.

* See Med. Trans., vol. iii. art. xxii.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.

Prognosis and
means of cure.

Specific proper-
ties of typhous
miasm.

Septic power
not necessarily
dependent upon
its debilitating
power.

Proofs that all
the secretions
of the body are
contaminated.

These peculiar
properties
should be
always in the
mind, and guide
the practice.

Congestion and
effusion fre-
quent from
weakness and
irregular ac-
tion.

Sometimes
inflammation.

be; for the most fatal pestilences, of which we have any account, seem to have been preceded by a stagnant atmosphere. Thus Maitland, in his History of London, observes, "that for several weeks before the plague broke out in this metropolis, in 1665, there was an uninterrupted calm, without sufficient motion in the air to turn a vane." The assertion is confirmed by Baynard, a contemporary physician; and a like harbinger, as is observed by Diemerbroeck, preceded the plague at Nimeguen.

In both varieties, the prognosis must be collected from the vehemence of the symptoms, and the character of the idiosyncrasy; and the cure must depend upon the means we may possess of supporting the vital power, and restoring its lost energy.

The peculiar properties, by which typhous miasm is distinguished from miasms of every other kind, are the rapid and direct debility with which it affects the nervous system; the activity of its leaven, by which it assimilates all the fluids of the body to its own nature; and the urgent putrefactive tendency it gives to every part.

The last of these properties may, in some degree, be dependent upon the first; but it does not appear to be entirely so; since we often find the sensorial power reduced to a much lower ebb, as in asphyxy from hanging or drowning, suffocating exhalations or lightning, catalepsy, and deliquium from loss of blood, while there is an almost infinitely less degree of tendency to putrefaction. And, in like manner, although the miasms of many of the exanthems, as rosalia or scarlet-fever, small-pox and plague, are also capable of tainting the secretions of the body, none of them appear to do it so completely and universally as that of typhus when in its most malignant state; in which the breath, all the egesta, and all the fluids are loaded with contagion. It has been propagated by the excrement*, by the odour of flowers employed to decorate the dead body†; by washing the bandages employed in typhous gangrene‡, and, in innumerable instances, by the communication of a minute drop of any of the fluids of the dead body to a punctured finger during dissection.

In forming our prognosis, and attempting a cure, these properties should always be prominent in the mind; for they will best enable us to calculate the nature and result of symptoms that are present, and will guide us to the most rational and satisfactory mode of practice.

From the debility that prevails, even from the first, the pulse is feeble and tremulous, the extreme vessels torpid, or nearly so, and the circulatory balance greatly disturbed. Hence, we have reason to expect, that effusion and congestion, or an irregular determination of the blood, will, in many cases, be an early attendant; and, if there be energy enough remaining in the organs thus affected to produce any degree of reaction, that local reaction will follow, and perhaps lead on to inflammation terminating in suppuration or gangrene; of which Sir John Pringle has given numerous examples. And hence there is some ground for contemplating typhus, as Dr. Armstrong has done, under the three varieties of a simple, congestive, and inflammatory affection; this last being sometimes

* Riedlin, Lin. Med., 1695. p. 402.

† Eph. Nat. Cur. Dec., ann. vii. viii. obs. 193.

‡ Hennen's Principles of Military Surgery, p. 218.

seated in one organ, and sometimes in another : most frequently, perhaps, in the brain, where Marcus supposes it to exist in every case whatever ; and occasionally, perhaps, in some of the secreting membranes, through all of which, it is conceived, in every instance, to extend by Hildenbrand, the rete Malpighi, the membrane that lines the cavity of the nose, of the mouth and throat, the tunica arachnoidea, and the mucous membranes of the stomach, intestines, and organs of urine and generation.* [It is a fact, now perfectly established, that, in certain forms of fever, the mucous coat of the intestines is often found in an inflamed, ulcerated, or even gangrenous state. The writings of Broussais, Andral †, Ribes ‡, and others in France, leave no doubt on this point, which has received still further illustration from the publication of Dr. Bright §, as was noticed in the consideration of remittent fever. Besides the affection of the head and nervous system, which seems to be connected with the first impression of fever, Dr. Bright is convinced, that there is a secondary state of cerebral irritation, which depends upon the mischief going on in the intestines ; and this often shows itself after the fever has continued for several days, increasing with the increase of the abdominal affection, and going on till it produces that general nervous agitation, with injected conjunctiva and constant delirium, which often closes the scene of life. These observations remind the editor of a fact, which, according to Dr. Ribes, has been completely established by M. Scoutteten by numerous dissections ; namely, that the connection between the intestinal canal and the pia mater is so intimate, that, when the former is affected with either acute or chronic inflammation, the latter always participates equally in the affection, with this particularity, that it only happens when the mucous membrane of the bowels is concerned, and not when the serous one alone is disordered. An observation made by Dr. Alison rather corroborates the foregoing statement ; as he notices, that, in the worst cases of remittent fever of children, the mucous membrane of the bowels is inflamed and ulcerated, and that one mode in which the case proves fatal, is by sudden conversion into an affection of the head. || The researches of Dr. Bright agree with those of the French pathologists in fixing upon the mucous membrane of the ileum, cæcum, and beginning of the colon, as the principal seat of morbid alteration, though occasionally the same membrane has been inflamed and irritated throughout the whole extent of the intestinal canal. “ The appearances (says Dr. Bright) which are most marked in the mucous membrane of the intestines, are those of increased action, vascularity sometimes occurring in patches of greater or less extent, without any obvious dependence on inflammation of the mucous glands, and occasionally extending, under some form or other, through the whole track from the pylorus to the rectum ; but this vascularity is more generally connected with inflammation of the mucous glands, which often appear like the small-pox on the second or third day of the eruption, elevated and almost transparent, with minute vessels which dip into them from the lining membrane of the intestines.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.

Morbid appearances of mucous membrane of the bowels in fevers.

* Ueber der ansteckenden Typhus, &c. Wien, 1815.

† Clinique Médicale, iv. tomes, 8vo. 1823—1827.
Anatomie Pathologique, tom. i. 8vo. 1828.

§ Reports, &c. p. 178.

|| Alison, in Edin. Med. Chir. Trans., vol. i. p. 433.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.

They scarcely seem to go into a state of true suppuration, but become distended with a yellow cheesy matter, and slough off; or sometimes ulceration takes place upon their points externally, without any collection of yellow matter being perceptible. The same process, or nearly so, takes place both in the solitary and in the congregate glands; except that, in the latter, the appearance becomes much more formidable, and the mischief more extensive. The masses, or clusters, of congregate glands, are chiefly placed along that part of the intestine which is farthest from the insertion of the mesentery; and, when the parts are irritated from disease, three, four, or five considerable branches of vessels are seen passing on the mucous membrane, from the mesentery on each side, towards the cluster of congregate glands." The glands themselves enlarge, and, after some time, form a thick flat mass, of a lighter colour than the surrounding intestine. This sometimes increases to the thickness of a half-crown piece, and occasionally even spreads on the top, so that the surface overhangs the base nearly the sixth part of an inch. Sometimes a dark-coloured matter, like grumous blood, is deposited amongst the glands; so that the whole mass, instead of being lighter than the intestine, is of a brown colour, elevated evenly above the surface; but, in either case, the mucous membrane is at first only raised, and not broken. In a little time fissures are formed, and the whole mass ulcerates. When the inflammation subsides, the depth of the ulcer diminishes; and the greater part of the glandular structure being apparently removed by ulceration and sloughing, the edges fall down, and the ulcer becomes shallow, sometimes leaving the muscular fibres nicely displayed, or often exposing the internal surface of the peritoneal coat to the extent of a quarter or half of an inch square. This excavation is filled up by the process of granulation, which, Dr. Bright says, may be seen very beautifully by suspending the intestine, cut open, before a lamp or the bright sunshine, and examining it with a common lens. When the whole is healed, a scar remains visible for some time, and appears to be covered by a true mucous membrane. These ulcerations are stated to be quite analogous to those painful and irritating sores, which frequently occur on the lips, or lining of the cheeks. The space, occupied by the ulcers in the intestines, is usually about two feet at the lower end of the ileum, and frequently the valve of the colon, on the side towards the ileum, is the part where the disease is most advanced. A few ulcers are likewise often found in the cæcum, and some are occasionally dispersed along the colon. The peritoneal coat at the back of the ulcers is generally discoloured and vascular, though seldom actually inflamed; which, however, it is sometimes, when the tenderness of the abdomen becomes more marked, and, after death, a sero-purulent effusion is found, and the convolutions glued together with threads of coagulating lymph. In a few rare cases, the ulceration extends completely through the peritoneum, the contents of the bowel becoming effused in the abdomen, followed by general inflammation of that cavity and death. Together with the foregoing changes, the mesenteric glands are usually found enlarged and vascular, particularly those which are situated opposite the intestinal ulcers, and which occasionally suppurate. In the remittent fever of scrofulous children, Dr. Alison represents the mesenteric glands next to the

Morbid appearances of mucous membrane of the bowels in fevers.

ulcerations of the mucous coat as being much swelled, and of a dark red colour, both externally and internally.* Dr. Bright's investigations confirm the remark of the generality of modern pathologists, as Andral, Percival, Macartney, and others, that, in addition to the preceding morbid appearances of the intestinal canal in subjects destroyed by fever, other organs frequently suffer as much as the bowels, and even more, especially the brain and its membranes, in which marks of congestion are very manifest. Nor, says he, is it at all unusual to find the lungs altered, as in pneumonia, and it is even more common to find them loaded with an extraordinary quantity of blood.†

Many of the cases, in which the above morbid appearances in the bowels were observed by Dr. Bright, seem to have been of the remittent type; though others were probably typhoid, as far as can be judged from the particulars recorded. The discharge from the bowels is very often dark coloured in typhus, but not always; and hence the circumstance of the morbid changes, pointed out by Dr. Bright, being denoted by the watery ochre-coloured appearance of the feces, must not be taken as a complete proof, that none of his cases were typhoid. It merits notice, that similar alterations of the mucous membrane are particularly described by the French pathologists as occurring in typhus. This doctrine has even been carried to such a degree, that, in France, the question has been entertained, whether the ileum and the valve of the cæcum are the real seat of the disorder, characterized by symptoms usually termed putrid and typhoid? A question, to which, as Dr. Ribes properly observes, a negative answer must be decidedly returned; because some facts prove, that typhus fever may be quite unattended with any of the foregoing morbid appearances in the ileum and valve of the cæcum, and the symptoms be connected with traces of organic disease in the stomach.‡ We have seen also, that inflammation and ulceration of the mucous coat of the bowels prevail in remittent and other fevers, which are quite different from typhus.]

It should never be forgotten, that typhus in every stage and variety is one and the same, a disease of sensorial debility; and

In what consists
the best hope of
cure.

* Alison, in Edin. Med. Chir. Trans., vol. i. p. 434.

† See Bright's Reports of Medical Cases, p. 180. et seq. 4to. Lond. 1827. After noticing the tendency to an inflammatory affection of the brain, Dr. Tweedie remarks, "that of the lesions in other organs, which arise in the more severe cases of typhus fever, congestion, or inflammation of the mucous membranes bronchial and intestinal, and inflammation of the parenchyma of organs, are the most important. The congested state of the capillaries of the mucous membranes, the blood being at the same time in a state which favours its transudation, occasionally gives rise to hemorrhage from different parts, more frequently, however, from the bowels than from either the nose, lungs, or any other cavity; and, when the hemorrhage is excessive, the already exhausted powers of the patient are often irrecoverably sunk. A similar hemorrhagic action is not unfrequently manifested in the skin, in the form of small red spots (*petechiæ*), or more extensive patches, termed *vibices*. In cases of still greater malignity, carbuncles, gangrenous inflammation of the skin, painful swellings of the lymphatic glands, and, in some seasons, especially in hospitals, erysipelas may arise." See Tweedie on Continued Fever, p. 80. — Ed.

‡ Anatomie Pathologique considérée dans ses vrais rapports avec la Science des Maladies, p. 102. tom. i. 8vo. Paris, 1828. A further refutation of this doctrine is contained in the writings of Laennec, and in Burne's Practical Treatise on Typhus. 8vo. Lond. 1828.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.

GEN. IV.

SPEC. II.

β E. Typhus
gravior.
Treatment.

As a common
rule severe
bleeding and
purgings to be
abstained from.

Gentle aperients;
but not emetics,
unless nausea be
present.

Emetics and
cold affusion.

that our only hope of cure depends on economising the nervous power that remains, supporting it as far as we are able without farther loss, and opposing the natural tendency of the disease by such tonics as the system will best bear.

On this account, whatever tends to weaken the animal frame generally, or any one of its functions particularly, must, as a common rule, be carefully abstained from; and hence severe evacuations, by bleeding * or purging, are among the foremost objects of prohibition.

The bowels, indeed, ought by all means to be moved by a gentle aperient; but beyond this we ought not to proceed, as we shall add to the debility, without obtaining any correspondent advantage. The grateful acids of tamarinds, cream of tartar, or prunes, are preferable, if found sufficiently powerful; but, if not, they should be combined with rhubarb or senna.† And, as the stomach is less irritable than in yellow fever, an emetic may be given whenever indicated; but, unless there be a troublesome nausea, even this had better be avoided. Ipecacuan will answer better than antimonial preparations, and the evacuation should be followed with a cordial draught.

[On this part of the subject, the following observations, delivered by Dr. Bateman, seem judicious. The first object is to arrest the febrile affection, if possible, in its very commencement, by means capable of exciting a kind of shock in the system. The two most efficacious remedies of this nature are emetics, and the affusion of cold water on the skin. The first has this advantage, that it may be employed in the very onset of the fever, during the presence of the rigors; while the second, although perhaps more powerful, is inadmissible until the hot stage be completely formed. If an active emetic be given during the chills, and a free vomiting be excited, the cold fit is often speedily terminated, and

* This doctrine should be qualified. "In the milder cases of typhus fever, blood-letting is seldom necessary, and may in general be dispensed with, unless some special circumstance arise to render it expedient; such as severe pain, or sense of weight in the head, flushing, intolerance of light, hot skin, and other symptoms, denoting a more intense form of fever. With such symptoms, the abstraction of a moderate quantity of blood, especially if the patient be young, or of a full habit, will be proper. If, however, the pulse, though rapid, be soft and compressible, the tongue begin early to assume a brown tint, and there be considerable prostration, the loss of blood cannot be sustained." See Tweedie on Continued Fever, p. 210. — Ed.

† On account of the greater tendency to inflammation of the mucous membrane and follicles of the intestines in typhus, Dr. Tweedie thinks, that every source of irritation, and, consequently, the stimulus of cathartics, should, as much as possible, be avoided. "If these precautions as to bleeding and purging are necessary in the early stage, they are more especially so in the advanced; at which period such aperients as remove unhealthy secretions without producing watery stools, are to be employed, viz. rhubarb, magnesia, or castor oil, with occasional doses of mercurials. It is necessary to examine daily the evacuations from the bowels in typhus fever. Bloody diarrhoea is always a most alarming symptom in fever, showing a malignant form of the disease. It depends on a loaded state of the capillaries of the mucous membrane. The congestion of the mucous membrane, and consequent hemorrhage, may take place without ulceration; but, when there is ulceration, the blood does not proceed from the open surface, but by capillary exudation. This symptom is best managed by suspending all irritating medicines, and administering occasional doses of superacetate of lead and opium." See Tweedie on Continued Fever, p. 213. — Ed.

a general glow, accompanied with a degree of perspiration, is produced. Or, if the emetic be delayed until the hot fit has commenced, its operation is frequently followed by a free perspiration, as well as a relief of every symptom.*]

But congestion, as already observed, may take place, and this too in the larger and more important organs of the animal frame, as the head, the lungs, or the liver.† If in the first, there will be a sense of oppression in the brain, most commonly combined with stupor, or low muttering delirium; if in the second, a laborious weight on the chest and a difficulty of respiration; if in the third, the bowels will usually be found costive, the motions pale and argillaceous, and sometimes the skin and the urine chlorotic, or of a greenish yellow from a regurgitation of morbid bile into the sanguineous system. Hence the fever will be aggravated from local irritation, and the affected organ will be in danger of inflammation, if not of gangrene.

Is the general rule in this case to be departed from? is blood to be taken from the system? and, if so, is it to be drawn locally or generally? and to what amount?‡

We have here only left to us a choice of difficulties. Nothing, as Dr. Fordyce has justly observed, is more dangerous in any fever, than its affecting one part more than another; but in typhus the danger is extreme, and it must be combated boldly and rapidly by whatever plan has a chance of taking it off, and however hazardous in itself, provided the hazard be less than that of the disease. And hence in this case, bleeding must be had recourse to, for there is nothing we can so well depend upon. If we have reason to believe, that the overloaded organ is without inflammation, the blood should be drawn locally and till relief is afforded; if there be good ground for suspecting that inflammation has commenced, and especially if the organ affected be large and important, it will be better to employ the lancet; and it cannot be employed too

GEN. IV.
SPEC. II.
§ E. Typhus
gravior.

Treatment.
Marks of congestion or oppression.

Is the general rule here to be departed from?

Only a choice of difficulties left:

but the danger must be combated boldly and rapidly, and by free bleeding.

* Bateman, in Rees's Cyclopædia, art. FEVER. Although Dr. Elliotson approves of giving an emetic in the beginning, yet, if there were tenderness of the epigastrium, or tenderness on making pressure on any part of the abdomen, he would not have recourse to such measure. Also, if there were violent determination of blood to the head, he would not recommend it. If this symptom existed, together with a full pulse, he would first bleed the patient. Lectures at Lond. Univ., pub. in Med. Gaz. 1832, p. 183. — Ed.

† For further information respecting the state of these organs, see Dr. E. Percival on the Epidemic Fevers of Dublin in 1813, 1814, and 1815; in Dublin Hospital Reports, vol. i. p. 304, &c. Also, Dissections by Dr. Macartney, recorded by Dr. Barker, in Trans. of King's and Queen's College of Physicians, vol. ii. p. 574. et seq. — Ed.

‡ As Professor Elliotson observes, "it is necessary, in every case of fever, to be constantly on the look-out for local inflammation; every day to ascertain what is the state of the affection of the head, of the affection of the chest, and of the affection of the abdomen. You should always ask if the patient complains of headache; you should look at his eyes, and see whether they be red or not; ascertain if his pulse be full, and enquire whether there be any throbbing of the head. So, with respect to the chest, you should observe, whether there is difficulty of breathing, and if there be, it is well to apply the stethoscope, and ascertain what rattling there is. The abdomen ought to be carefully felt every day, to see whether the stomach, intestines, liver, peritoneum, or other parts, are inflamed. When we find a sufficient degree of inflammatory disturbance of these parts, then it is right to take away blood locally." Lectures at the London University, pub. in Med. Gaz. 1832, p. 210.

1 GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.

Risk in the
practice, but
death without
it.

soon, nor ought it to be relinquished till it has attained its object.* There is a risk in the practice; but there is death without it. Fainting may perhaps take place in the midst of the operation; but this is rather to be wished for than guarded against; for the exhaustion of sensorial power, produced by deliquium, bears no comparison to that produced by the influence of the typhous miasm.

The following remarks of Dr. Baillie upon this subject, as indeed upon most others, are peculiarly important; and the more so from the modesty with which they are given, and the striking proof of the candour which so particularly distinguished this great and experienced man. It is thus he writes, towards the close of his active and honourable career: — “During the greater part of the time in which I have practised medicine, physicians in general, and myself among that number, have, I believe, been too sparing in taking away blood in typhus fever. It was hardly ever directed to be taken away from the arm, and not often locally, except by the application of leeches to the head. Of late years many physicians have gone into the opposite extreme, and have taken away blood too profusely. In the course of a few years, this remedy, like every other, will find its proper level.” †

Stimulant
purgatives.

In the above state of the disease, namely, that combined with visceral congestions, also, instead of merely keeping the bowels open, we should employ purgatives that will maintain a stimulating effect upon the whole of the intestinal canal, so that three, or even four, evacuations may be obtained daily; and calomel will be commonly the best medicine for this purpose. [When the symptoms indicate irritation and ulceration of the mucous membrane of the bowels, Dr. Bright prescribes the hydrargyrum cum cretâ, and the compound chalk powder, with or without ipecacuanha; and if the alvine evacuations are too scanty, he gives castor oil with a few drops of laudanum. This, with fomentations, leeches, and cupping of the abdomen, according to circumstances, is the practice from which he has seen the greatest benefit result, where fevers are attended with the complication of diseased mucous membrane of the bowels. ‡]

Treatment of
diseased mucous
membrane
of the bowels.

Such are the exceptions, and the only ones, we should allow to the general rule of opposing the disease, by economising, supporting, and restoring the depressed tone of the nervous system. But there are pathologists, and of considerable authority, who recom-

Examination
of the practice
of venesection
as a general
instead of a
special rule.

* J. P. Frank, *De Cur. Hom. Morb. Epit.*, tom. i. p. 136. 8vo. Mannh. 1792.

† Lectures and Observations on Medicine by the late Matthew Baillie, M.D. 8vo. 1825, unpublished. Printed by Taylor.

‡ See Bright's Reports of Medical Cases, p. 184. 4to. Lond. 1827. The following is the advice, delivered by Professor Elliotson: — “If there be vomiting, or tenderness at the epigastrium without it, you should apply leeches there, which are the best remedy for it; because, when there is tenderness or vomiting, it generally arises from inflammation of the mucous membrane, and leeches will remove it by removing the causes of inflammation. So, with regard to the abdomen at large, when that is tender, there is generally more or less diarrhœa; the intestines are acting too violently, and leeches, freely applied, are the best mode of restraining it. After they have been applied, you may employ a blister; but you should always remember, that a blister will not answer as a substitute for local bleeding, if the inflammation be considerable.” Lectures delivered at Lond. Univ., and publ. in *Med. Gaz.* 1832, p. 211. — Ed.

mend bleeding, and even full bleeding, in almost every instance of the disease, as the first step to be pursued: thus inverting the mode of practice here laid down, and taking the exceptions for the rule, and the rule for the exceptions.

The theory of this recommendation is but of little importance, provided it be justified by its result. At the same time, I cannot avoid observing, that its chief advocates have not been able to bring themselves to any thing like a common theory, or to support their recommendation upon common principles; than which nothing can be more unfavourable to the reception of a doctrine, or more hostile to its scientific pretensions. Typhus is, by Dr. Clutterbuck, regarded, like every other kind of fever, as the result of an inflammation of the brain; and blood-letting is here grounded upon the principle of attacking the cerebral inflammation, and *debilitating* the action of the living fibre. The visceral and other local congestions and inflammations that so often occur, are, by Dr. Armstrong*, regarded as precursive and generative of the sensorial debility, while the disease itself is no more derived from the brain, than from any other organ. And blood-letting, under this view of the subject, is recommended as the means of *preventing* debility in the living fibre, instead of *adding* to it. "We may perhaps find," says he, "sufficient data for concluding that the nervous appearances, even from the very first attack, are only secondary of vascular disorder." Now, these hypotheses, discrepant as they are from each other, may be both founded upon a mistake of the effect for the cause.† And such, indeed, seems to be the general opinion of pathologists, upon the subject; and hence, even admitting the benefit of blood-letting, as an invariable or common rule, we have yet to search for *some other reason*, by which such benefit is to be explained. Dr. Jackson thought he had found this reason in the *stimulant* effect of venesection upon the system at large, which, by exciting new motions, suspends or changes morbid motions, and affords room for the vires medicatrices naturæ to act with a more salutary power; while, by its mechanical effect in diminishing the circulating fluid, it adapts the moles movenda to the vis movens. Venesection, therefore, upon Dr. Jackson's hypothesis, acts not by debilitating, or even preventing debility, but directly by *invigorating* the living fibre; and in this view he employed it in fevers of every kind, entonic and atonic, inflammatory and putrid, and, in his own belief, with nearly equal success.

But this is to regard the blood as an incumbrance, a dead and foreign body in its own vessels, instead of as a living and nutrient principle; the removal of which affords ease and freedom to every part of the animal frame, and clears it for the contest in which it is about to engage. A violent and general commotion, produced in the system from severe bleeding, or any other cause, cannot fail of exciting a very deep impression upon every part; and has often suspended or changed the actual train of motions, and introduced a new train in its stead; and, in various instances, the change has unquestionably been beneficial, and even salutary. This is particularly the case in sudden and overwhelming excitements of mental

GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.

The advocates
for such prac-
tice not agreed
upon common
principles.

Employed to
debilitate the
living fibre.

Employed to
prevent debi-
lity in the
living fibre.

Employed di-
rectly to invi-
gorate the
living fibre.

In what man-
ner severe
bleeding is
sometimes ser-
viceable in
other cases than
inflammation.

* Practical Illustrations of Typhus, &c. 8vo.

† Appendix to his Remarks on the Constitution of the Medical Department, &c.

GEN. IV.
SPEC. II.
E. Typhus
gravior.
Treatment.
Singular case
from Van
Swieten.

Exemplified in
diabetes and
lyssa.

Other evils
resulting from
the practice.

Pring.

Theory of little
importance if
the practice be
beneficial.

Aggregate of
practice ex-
amined.

Practice of
many centuries'
standing, alter-
nately revived
and abandoned.

emotion, which have, sometimes, abruptly cut short the career of fevers as well as of various other complaints; of which the Baron Van Swieten gives a striking instance in a man, who, while labouring under a continued fever, with delirium, was so alarmed at the terrific aspect of a person that burst suddenly into the sick room, vociferating that the house was on fire, which in this case was the fact, that he rose without help from his bed, ran out of the house with all speed, and was well from that moment. To this principle of salutary change of action, excited by a violent and general commotion throughout the system, it is probable, that we are to ascribe the occasional benefit that has followed upon draining the vessels of blood in diabetes, and even in lyssa or canine madness. And it is possible, therefore, that copious venesection may, also, in many instances, have cut short the attack of typhus, and thus proved a rapid and effectual remedy. But, if this be the ground upon which it acts, few practitioners would be disposed to recommend it; while, if it be not, we have no other ground that will furnish us with a satisfactory explanation.

In the commotion which takes place from copious venesection, it should moreover be observed, that there are often local determinations of other kinds or to other organs; for, the more we lessen the general strength, the more we make an inroad upon the instinctive power of preserving a balance in the circulating system; and as these new determinations are almost uniformly accompanied with an apparent, though a deceptive, increase of force as well as of fulness in the pulse, and other symptoms of great violence of action, the friend to phlebotomy is too often stimulated to an exercise of his lancet through several times in succession, still wondering at the perversity of an action, whose mischievous and, it may be, fatal perseverance is only maintained by his own exertions. The following remark of Dr. Pring is, upon this subject, of great value, as well as perfectly correct:—"It is commonly, and in my own experience it has been invariably, the case, that those, who have sustained great losses of blood, suffer more or less from what is called determination to the head. The symptoms most commonly are, intense pain and throbbing in the forehead or back part of the head, with a pulse seldom under 90. I have known these symptoms, to proceed on, with a pulse from 120 to 140, to delirium, apoplexy, and death."*

But the author has observed, that the theory is of little importance, provided the practice has justified itself by the event. How then stands the sum of general opinion upon this subject, even apart from such occasional fatalities? The practice is by no means new, though ordinarily supposed to be of recent origin; for it has alternately lived and died away, been revived and again sunk into disrepute, for considerably upwards of three centuries; and its advocates have, in various times, been as numerous and as confident, and have maintained as warm a contest, as we are called upon to witness at present: of which any one may convince himself who will turn to the books referred to, in proof of this assertion, at the foot of the page †; of which the first three were published

* Principles of Pathology, &c. by Daniel Pring, M.D. 8vo. 1823.

† Bernardi Caxanes, De Ratione mittendi sanguinem in Febribus putridis, Barcelon. 1592. Sylvaticus, De secundâ in putridis Febribus venâ quam Salvatel-

in the sixteenth century, the ensuing two in the seventeenth, and the last two in the middle of the eighteenth. Professor De Büchner, of Halle, was strenuously opposed in his recommendation of venesection, at Paris by Chambon de Montaux, and at Rome by Sinibaldi. Yet, as in the present day, the supporters of the depleting system had also not a few controversies amongst themselves, though they were not precisely of the same description as those in our own time; the chief point of dispute being the part of the body from which blood could be drawn with most advantage; some practitioners performing on the arm, and others on the leg or foot; a point, however, that gradually lost its importance, as the doctrine of the circulation of the blood became more generally adopted and understood. It is not a little singular, nevertheless, that Dr. Marcus, who is entitled to the distinction, if not of reviving the plan of sanguineous evacuation in the present day, at least of carrying it to a more daring extreme than any other practitioner, and of stamping its general use with all the weight of his authority, was, only a few years before the publication of his "Special Therapeutics," in which the advantages of bold depletion were first triumphantly promulgated, one of the most ardent disciples of Dr. Brown of Edinburgh, and consequently one of the warmest advocates for the opposite system of cordials and stimulation.

Judging, therefore, of the expediency of blood-letting from the history of the practice before us, when enforced as a general rule in typhus, the sum of medical opinion upon a trial of three centuries is against it. The practice has occasionally started into popularity; but it has never been able to establish itself. In the peculiar states of the disease I have already adverted to, it may be useful, and ought not indeed to be neglected: but every case must speak for itself, and the rule must not be confounded with the exceptions. And such, in effect, was the opinion of Dr. Gilchrist, as expressed in his treatise on Nervous Fevers, published seventy years ago, in which he tells us that, at that period, "the ordinary evacuations in the beginning were bleeding and vomiting," and that it was sometimes "necessary to bleed once, and again, by which the symptoms were considerably lessened."* But he had too much good sense to enforce this practice indiscriminately, and felt the necessity of yielding to contingencies: for, in many instances, he adds, "though we bleed, the symptoms are not always much abated by it; and if we bleed freely, being deceived by an appearance of plethora, we do harm: indeed, in general," continues he, "I imagine bleeding seldom did much good; and if great caution were not used, I suspect it was hurtful: but as I was not often called in the beginning, I am unwilling to pronounce positively about it." The passage is well worthy of attention, as containing the free opinion of an able, candid, and distinguished writer upon an extensive examination of the subject in his own day: and an opinion, too, which is very consider-

GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.

Former contro-
versies between
the advocates
for the practice.

Inconsistency
of practice in
Marcus.

The sum of
medical opinion
against it as
a general rule;
though highly
needful in par-
ticular cases.

Iam dicunt, 1583. — Turini, An in omni Febre putridâ compater phlebotomia? Rem. 1545. — Nigrisoli, Progymnasma de venâ in Febre malignâ secandâ? an superiori an inferiori? Guastalla, 1665. — Suavalla, Ergo malignæ febri venesection? Paris, 1694. — De Büchner, Diss. de Venesectione in febris acutis malignis, Halle, 1757. — Gilchrist, Edin. Med. Essays, vol. iv. art. XXIII.

* Edin. Med. Essays, vol. iv. p. 281.

GEN. IV.
SPEC. II.
Æ E. Typhus
gravior.
Treatment.

ably in accordance with the opinion and practice of Sir John Pringle and Dr. Huxham, and still more lately of Professor Hildenbrand, who is well known to be one of the most extensive practitioners in the disease before us, as well as one of the most able writers upon it in the present day.

The fact is, that action has too generally been mistaken for energy, than which a more fatal error can never be committed. The immediate effect of profuse or repeated bleeding is exhaustion; but this effect shows itself in very different ways in different constitutions or idiosyncrasies, the principle of which the reader will find explained under the subject of syncope. While this exhaustion continues, there is a diminution of action of every kind, morbid as well as natural, and hence an imposing appearance of relief to the symptoms of the disease; but it no sooner takes place than an instinctive effort is made, the *vis medicatrix naturæ*, to remedy the evil hereby produced, and to restore the system to its former balance of powers. This effort is called a rallying or reaction of the living principle. The arteries contract, to adapt themselves to the measure of blood that remains; the sensorial organ is roused to the secretion of a larger proportion of nervous power to supply the inordinate drain that takes place during the general commotion, all is in a state of temporary hurry and urgency, and for the most part irregularity of action, while the instinctive effort is proceeding. And hence, no sooner is the immediate effect of prostration, exhaustion, or syncope overcome, than the heart palpitates, the pulse beats forcibly with a jerking bound, the head throbs, the eyes flash fire, and the ears ring with unusual sounds. Now, it often happens that these concurrent signs are mistaken for proofs of latent or increased vigour, instead of being merely proofs of increased action; and action, too, that adds as largely to the exhaustion as the depletion that produced it: and the unhappy patient is bled a second, a third, or even a fourth time, till no such reaction follows; at which time it is strangely supposed that the entony, plethora, or inflammatory diathesis, is subdued and lulled into a calm, because the patient has been so far and so fatally drained of his living principle that there is no longer any rallying or reactive power remaining; and gives up the ghost, in a few hours, to the treatment, instead of to the disease.

There is a valuable paper upon this subject, from the pen of Dr. Marshall Hall, in a late volume of the Transactions of the Medico-Chirurgical Society, which should be read by every one before he ventures to employ his lancet in the case before us. "The symptoms of exhaustion," says he, "with reaction, have, I am persuaded, frequently been mistaken for those of INFLAMMATION, or other DISEASE OF THE HEAD OR HEART. Under this impression, recourse has frequently been had to the further detraction of blood by the lancet; and the effect of this practice is such as greatly to impose upon the inexperienced, for all the symptoms are perhaps fully relieved. It was some time before I could fully comprehend the nature of this fact. I had satisfied myself that, in certain cases, the symptoms were those of loss of blood, and yet it appeared to me no less certain that those very symptoms were relieved by the lancet. At length I discovered, by careful observation, that the symptoms, which were relieved, were those of

Reaction after
bleeding mis-
taken for
power.

re-action, and the mode of relief the substitution of syncope; that the relief endured as long as this state of faintishness continued, but returned as this state gave way to the rallying and re-action of the vital powers.*

It should never be forgotten, however, that the expediency of bleeding must depend, not only on the diathesis of the individual, but very considerably on the state of the atmosphere. This remark I wish to enforce very strongly on the attention of practitioners, as it is derived from experience, and is of more importance than it may at first appear to be. As inflammatory fever has sometimes a tendency, from peculiarity of constitution or accidental circumstances, to run rapidly into typhus, typhus, in like manner, occasionally meets with incidents that suddenly reverse its character, and incline it to an inflammatory type. A very stimulant plan of treatment has sometimes done this; but far more frequently, a sudden change in the atmosphere, from hot, hazy, and relaxing weather, with scarcely a breath of air stirring abroad, to a dry, cool, and refreshing east or north-east breeze: and I have often found a like tonic effect produced upon a patient labouring under typhus in a low, damp, filthy, and suffocating lodging, upon his being removed into a large, cool, pure, and well-ventilated chamber, such as is now generally found in our fever institutions. In this case, bleeding, which I had not dared to risk, notwithstanding some symptoms of oppression, before the removal, has been practicable without any risk afterwards, and has laid the foundation of a speedy and effectual cure; and I am inclined to think, that some part of the clash of opinion, which prevails upon this subject in the present day, proceeds from a want of due attention to the different states in which different or even the same patients are placed by this difference in the purity and temperature of the surrounding atmosphere; and that many hospital physicians, who are the warmest advocates for sanguineous depletion in their own fresh, cool, airy wards, would hesitate upon its expediency if they were to attend their patients throughout in their own close, heated, and miserable habitations.

[This accords with Dr. Alison's experience, who remarks that "there is probably less typhoid tendency in the earlier stages, and more demand for evacuations in the hospitals, than in the houses of the poor."† The ill effects, however, which this able physician imputes to the removal of patients in the second week of the disease into a pure cool air, seem to the editor more justly ascribable to the disturbance of such removal than to the altered quality of the air itself. That great and decided benefit does result from the timely removal of the patient out of a bad atmosphere, is proved by the valuable testimony of Dr. Bateman, who "frequently experienced the great and obvious benefit of a cool and well-ventilated room, independently of medicine. He has visited patients who had applied for admission into the House of Recovery, in their own close and suffocating apartments, and found them in a state of delirium, with dry black tongue, great heat, and other bad symptoms. Having directed them to be removed to the house, he has found them cool and perfectly collected, with other symptoms of

GEN. IV.

SPEC. II.

β E. Typhus

gravior.

Treatment.

Its expediency often dependent on the state of the atmosphere.

Clash of opinion capable of being considerably reconciled.

Typhoid character of fever influenced by the state of the air, good ventilation, &c.

* Medico-Chir. Trans.; vol. xiii. part i. p. 140.

† Alison, in Edin. Med. Journ., No. xciii. p. 250.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.

Hospital at
Bilboa, in
1813.

equal amendment, on the following morning, from the mere influence of a cool bed and an airy apartment.* No doubt, however, Dr. Alison's opinion on the disadvantage of removing the patient in a late stage is perfectly well founded, as the editor has had many opportunities of learning from experience.]

Upon the subject of bleeding, there is a passage in Dr. Hennen's *Military Surgery*, so strikingly in point, that I cannot avoid quoting it. After the famous battle of Vittoria, in July, 1813, the sick and wounded of the British and Portuguese army were chiefly removed to a temporary hospital established at Bilboa; where, typhous miasm having soon been produced by its ordinary causes, viz. a foul and stagnant atmosphere, crowded wards, and depressed spirits, the sick were soon affected, and, whatever was the nature of the individual constitution, the wounds of all of them ran rapidly into a typhous gangrene; "exhibiting," says Dr. Hennen, "one of the most subtle and destructive poisons that ever infested an hospital, attacking equally the most robust and the most debilitated, and, if unchecked by medical aid, proceeding invariably to a fatal termination."† The atmosphere was, at this time, sultry and relaxing, and greatly contributed to the general debility. "I need scarcely say," continues Dr. Hennen‡, "that a remedy so strongly recommended as venesection had early occupied our attention; but, previous to the month of October, the obviously typhoid type of the disease made us extremely averse from employing it. At that period, however, a change in the weather from sultry to cold, and even frost (at night) took place, marked by a corresponding change in the thermometer, which, at its medium range, was 20° lower than in the preceding month. But what more than all convinced us of the change of type, and pressed on our consideration the propriety of bloodletting, was, that the spontaneous hemorrhages, which formerly sunk the patient's strength, were now accompanied with obvious relief." And he proceeds to state, that, from this time, the practice of venesection, on the appearance of inflammatory symptoms in a wound or newly healed stump, became general, and was the only remedy had recourse to, whether as a cure or a preventive.

Importance of
being guided
both by particu-
lar and general
circumstances.

Of such importance is it for us to be guided by particular and general circumstances in the treatment, not merely of typhus, but of all diseases whatever: to let the rule have its exceptions, but not to mistake the exceptions for the rule. "The art of physic," says Sir George Baker, "rarely admits of any perpetual precepts; and the best medicine may do harm, if not adapted to the patient as well as to the disease."§

Cold water as
a remedy,

There is another remedy of very extensive use in the cure of typhus, far less disputable, and which is founded altogether upon the indication of equalising, supporting, and restoring the sensorial power, and that is, the free application of cold water, and especially externally.

employed
almost imme-
morially;

This valuable medicament has been employed in some form or other almost immemorially. Hippocrates recommends it in malignant fevers, generally in the form of epithems, or napkins wetted

* Art. FEVER; Rees's Cyclopædia.

† Principles of Military Surgery, p. 19.

‡ Id., p. 223.

§ Med. Trans., vol. iii. 417.

with cold water, and applied repeatedly to the head, or any other viscus, as the cloths become warm.* Among the later Greeks, however, it does not appear to have been in very general use; and, though it is highly prized by Celsus, in various debilities, and especially sensorial debility affecting the head, and combined with fever, in which, says he, “*existat validissimè repentè aqua frigida infusa*,” yet it does not seem to have constituted a fixed, or even a frequent, practice in his day. In our own country, it was successfully employed by Dr. Willis in various fevers, and especially those accompanied with delirium; and was hence strongly recommended by Sir J. Floyer and Dr. Baynard: and was used on the Continent, not merely in the form of epithems†, and affusions, but occasionally in that of immersion, or cold bathing in a river adjoining the patient.‡

On the Continent, indeed, it seems to have been employed at a much earlier period than in our own country, as we learn from Milot's Dissertation, “*Ergo febris frigidis et humidis expugnenda?*” printed at Paris in 1594; and Hernault's, on the same subject, “*Ergo propria febrium medela refrigeratio?*” printed in the same place in 1630. It was also used internally as well as externally, both in our own country as well as on the Continent, especially in Spain and Naples, as is obvious from Dr. Hancock's *Febrifugum magnum*||, and Dr. Cyrillo's paper on the subject in the *Philosophical Transactions*. Even snow, or snow water, under the name of *aqua nivata*, or *aqua nive refrigerata*, was also occasionally employed¶, and, in the ardent fever, recommended by Paullini, both externally and internally.** Professor Hildebrand, of Vienna, during the extensive range of practice which the Austrian army afforded him in the late war, employed sometimes the cold bath, sometimes affusion of cold water, and sometimes a general friction of the surface with snow itself in the commencement of the fever.†† And, to prove how torpid to common impressions the body is under nervous fevers generally, and how little disposed to be injured by such applications, it is only necessary to advert to the case of a patient at Lucca, given by Dr. J. Benevuti, in another part of the *Transactions* just referred to. On the ninth and tenth day from the incursion of a malignant fever, he was thought to be in great danger. On the eleventh, he expressed a wish to go to sleep, and desired the attendants to withdraw. On their return, he was found to have left his bed; and, three days afterwards, was discovered in a hut in a vineyard, about two miles from the house, having but just recovered his senses, and as much wondering how he came there as those who had traced him out. It appeared, on

GEN. IV.

SPEC. II.

β E. Typhus
gravior.

Treatment.

though not very
generally
adopted in
Greece or
Rome.Early as an
external appli-
cation in Eng-
land.Still earlier on
the Continent.Used internally
as well as exter-
nally.

Snow-water.

Snow alone.

Singular case
from Benevuti.Body torpid to
the action of
external influ-
ences.* *Περὶ Νοσῶν*, II. p. 484. 50.† *Medicinæ*, lib. iii. sect. xx.‡ *Mursinna über Ruhr und Faulfieber*. Loeffler, *Beyträge*, &c.§ *Eph. Nat. Cur.* Dec. III. ann. iii. obs. 48., and ann. v. vi. app. p. 128.|| *Febrifugum magnum*; or common Water the best Cure for Fevers. Lond. 1752. The editor saw many fevers in the Military Hospital at Canterbury, in 1813, treated entirely by sponging the body with cold water, and making the patient drink copiously of the same cheap article. The success of the plan was considerable. — Ed.¶ *Nouvelles Annales de Médecine*, iv.** Cent. i. obs. 66. — See also Nehemias (Abrah.) *De tempore aquæ frigidaë in febribus ardentibus ad satietatem exhibendaë*, 8vo. Venet. 1591. — Planchon, *Journ. de Méd.*, tom. xxx. p. 127. Lamarque, *id.*, tom. lxi. p. 460., lxvii. p. 68.†† *Ueber den ansteckenden Typhus, &c. ut suprâ*. Wien, 1815.

GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.

farther inquiry, that he had descended from his chamber by the window, in his shirt alone, and in a great perspiration; had walked all the way in the snow with which the ground was then covered, and had swallowed a large quantity of it to quench his thirst. Yet neither the cold air, nor cold beverage, affected him otherwise than beneficially. He continued well from this time.*

Cold water formerly employed incautiously.

The use of cold water, however, as well external as internal, appears on many occasions to have been employed with too little caution; and hence one reason of its falling into frequent disrepute. Even as early as 1581, Masini thought it right to guard the profession against its abuse, by a work expressly devoted to this subject†; and numerous others occurred in succession through the ensuing century.

Practice of the present day: by whom renewed.

In our own day, Dr. Wright of Jamaica is, perhaps, the first physician who revived the practice; but it is chiefly to the judgment and experience, the writings and recommendation of Dr. Currie of Liverpool, that cold water as an external application is indebted for the high and deserved degree of popularity it again possesses, and especially in typhus.

In what forms employed.

It is now equally used in the form of sponging, ablution, and affusion, the last of which is the *κατάκλυσις* of the Greek writers, though this term sometimes also imported immersion. All these are of essential use; yet the most sudden and decisive benefit has been observed to result from affusion; for which purpose the patient is to be supported on a stool in a low wide tub, and to have a small bucket of water, containing about two gallons, poured briskly on his head, and repeated four or five times in the course of the twenty-four hours, when the surface of the body is hot and without perspiration. In many cases, this plan alone has proved successful, and the fever has been cut short in a day or two from its commencement. But the method is too violent and exhausting to be employed after the first three or four days of attack; after which it will generally be most useful to restrain ourselves to epithems about or all over the head, the hair being removed for this purpose, or to sponge the body generally: and if the sensorial debility be extreme, we should prefer tepid to cold water, or mix with the cold water a little brandy or other spirit. When this method succeeds, the usual salutary effects are, a considerable diminution in the number of the pulse; diminution of heat and headach; natural sleep, and a breathing perspiration.

On what principle the practice is beneficial.

Whether the water operates as a tonic?

It does not appear to me that the principle has yet been fully explained, by which the external application of cold water becomes thus unequivocally beneficial. This is generally referred to its tonic power in exciting a reaction as the result of its chill. But though affusion often produces not only a chill, but even horripilation, sponging the body with tepid or even with cold water produces no chill of any kind; and there are many cases of extreme debility in which, if a chill were to take place, it would be most mischievous, and certainly would not be succeeded by any heat or reaction whatever. Independently of which, the refreshment takes place too speedily for such an effect, and is of a different and more tranquillizing kind, than the excitement which follows upon the chill of cold bathing in a state of health.

* Phil. Trans., vol. viii. 1768.

† De Gelidi Potūs abusu. 4to. Cesen.

Upon internal medicines we can place but little dependence, except where they have pretensions to a tonic power, are moderately cardiac, or tend to equalize the nervous influence or circulating fluid.

The chief tonics, in use among the Boerhaavians, were the serpentaria and contrayerva, on account of their systematic objection to the bark. The tonic power of these, however, is but feeble; by their stimulant property, they sometimes prove diaphoretic: but even as cardiacs their place is better supplied by other medicines; and, in proportion as the bark has established itself, they have gradually fallen into disrepute. Yet even this last seems to be following the same track in the opinion of some practitioners of the present day, who have withdrawn all confidence in it, and undertake to affirm, that it has done more mischief than good. But this is strangely to set aside the wisdom of former times, and to misconstrue the train of phenomena before them. Bark, like every other medicine, is necessarily injurious when injudiciously made use of; but there are few, if any, medicines of more importance, even in typhus, when there is a fit opportunity for employing it. Where the stomach is irritable, and will not retain it, or so feeble in its discernment power as not to digest it, and particularly, where there is a tendency to local accumulations, it ought unquestionably to be avoided, till these symptoms are subdued by other means. But, where there are no such objections, it cannot be begun too soon, though it should not be pressed in such large doses as in the more rapid course of yellow fever. And where the bark cannot be made to sit easy on the stomach, its place may be well supplied with columba, either in powder or infusion. I need not add, that the sulphate of quinine is its best form.*

If the skin be greatly heated and dry, either of these medicines may be combined with nitrate of potash, or a solution of the acetate of ammonia; and if the prostration of strength be considerable, we may employ camphor or wine in conjunction with tonics.

Camphor has, indeed, been united with medicines of very different powers; as with large doses of nitrate of potash, or nitrate of potash and calomel, which was at one time a favourite practice

GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.
How far internal remedies
useful.
Tonics of the
Boerhaavian
school feeble;
and have
yielded to
cinchona:
now itself
slighted by
many;
but without
sufficient reason.

Columba.

Combined with
neutral salts,

camphor and
wine.

* Dr. Cullen lays it down as a rule, that whenever bloodletting is proper in continued fever, bark is prejudicial. Dr. Bateman, in the early part of his practice, used to prescribe cinchona on the first appearance of languor and debility; and he followed this method till he was convinced that it had pernicious effects, rendering the tongue dry and brown, the pulse harder and quicker, the skin hotter and more parched, &c. Hence, he nearly abandoned bark altogether. Dr. Tweedie also deems this medicine hurtful in the early stage of epidemic fever, and, when the symptoms of fever have completely subsided, he considers no tonic nor stimulating treatment necessary, unless the patient be much enfeebled, and the recovery of the strength slow. But he holds its exhibition in the early stages of fever, under any circumstances, improper, as tending to keep up or increase the febrile action; and, when there is local complication, he sets it down as still more improper. "When the fever is of the typhoid form, and the symptoms, as the disease advances, denote failure of the powers, more particularly if the pulse become soft and compressible, the skin covered with petechiæ, and there be tendency to gangrene, bark, in addition to nourishment, wine, and other stimulants, may be given with the best effects. The sulphate of quinine, combined with sulphuric acid, is the best mode of administration." Tweedie on Continued Fever, p. 225.

GEN. IV.
SPEC. II.
§ E. Typhus
gravior.
Treatment.
Camphoralone,
or in combina-
tion.
Its beneficial
effects.

Acids; their
action.

Wine: how
best employed.

Spirit of wine
given formerly.

Cured by
ebriety.

in Germany*; or, which is far better, with cinchona, a combination peculiarly recommended by Lasonne as increasing the energy of each, in which opinion he is joined by Dr. Cullen. Camphor, however, is in itself a highly valuable medicine on the present occasion, and cannot well be given too soon. It calms the low delirium, produces a genial glow on the surface, and seems to act as a steady permanent cordial. It was chiefly trusted to by Professor Hildenbrand during the late war, though he often united it with arnica; and, believing that no practice whatever could shorten the natural course of the disease, endeavoured to sustain the system by these remedies almost exclusively.

Acids, indeed, of all kinds, and acidulous drinks, are of great benefit in typhus. They allay the heat, tranquillize the restlessness, support the strength, and oppose the tendency to putrescence. The muriatic was preferred by Sir William Fordyce, but the sulphuric appears to be equally efficacious, and is much pleasanter.

The best cordial is wine, and it must be given in proportion as the living power flags. We must be cautious, however, in first administering it; for its very stimulus produces exhaustion, and, consequently, increased torpidity: and we should invariably recollect, that, when we have once commenced with its use, we can never leave it off; and should hence begin with such doses only as may be safely persevered in, or even increased if necessary.

Under the influence of Dr. Brown's name, both wine and spirits were lately given in enormous quantities; and it is possible, that, in a few instances, the practice may have been successful; but the risk is great and empirical; yet the practice is by no means of so late an origin as Dr. Brown's name would incline us to believe: for Borelli, Chambon de Montaux, and Reidlin, gave it quite as largely, and at least with as much success. Borelli prescribed it in injections†; Reidlin assures us, that he cured a patient by administering a large dose of spirit of wine‡, upon which Brown does not appear to have ventured; and we are told by another writer, long before Dr. Brown's time, that he completely succeeded in conquering a typhus by making his patient drink wine to ebriety on a critical day.§

* Abhandlung von der Wirkungen des Camphors und Calomels in anhaltenden Fiebern.

† Cent. i. obs. 55.

‡ Lin. Med. 1695, p. 220.

§ Eph. Nat. Cur. Dec., 1. ann. iii. obs. 145. With respect to wine, as a remedial agent in typhus, Dr. Wilson Philip offers two general remarks; the first is, that more or less wine is beneficial in all severe cases of typhus; and that there are few, in which large quantities are not injurious. The exhibition of wine in typhus must be as much regulated by circumstances, as bloodletting in synocha. "Wine is seldom necessary in the early stages, nor, as a general rule, at any period of the acute forms, unless, as occasionally happens, unexpected exhaustion come on, or towards the decline of the disease, the powers give way. Under these circumstances, a few ounces of wine, if the skin be cool, the pulse soft, and the tongue moist, will frequently improve the condition of the patient." (Tweedie on Continued Fever, p. 216.) According to the experience of the same physician, the propriety of administering wine in fever will sometimes depend upon the type of epidemic fever. In 1829, as the records of the London Fever Hospital prove, fever required a most decided antiphlogistic treatment; in 1830 and 1831, the symptoms, assuming a low typhoid form, a more stimulant plan became necessary. We have seen, that local inflammations not unfrequently arise in

Opium appears to be of less service in typhous, than in many other species of fever, and by no means entitled to the unmeasured eulogy bestowed upon it by Dr. Home, who contended, that, in every case of typhus, it was the most useful medicine; that it procures rest without any inconvenience; and that it is more to be depended upon than camphor, castor, the sedative salt of Homberg, or any other medicine of the same class.* It is best given in combination with camphor; and there is ground for the assertion of Lasonne and Hall, that, thus united, it produces less confusion of the head and disturbance in the dreams: and, so far as I have seen, it agrees better with the young than with those of middle life. Hildenbrand reserves it in every instance against distress from dysentery or diarrhœa.†

Antimonials are a doubtful remedy: they tend to throw the action towards the surface; but, as relaxants, they tend at the same time to diminish the tone of the muscular fibre. It is not often that they can be employed with advantage. In many instances, blisters, judiciously interposed, will be found useful auxiliaries, and especially where the head is much affected; but the body should not be covered with them, as is often the case, from head to foot, so as to be highly distressing to the patient, and to exhaust the little irritability he has left. Cataplasms or bottles of hot water applied to the feet, when the circulation is unequal, will often be a better practice.

During the entire course of the fever, from the time the bowels have been sufficiently evacuated, the patient may be allowed animal broths and jellies in alternation with the farinacea: he should be lightly covered with bed-clothes; his chamber should be freed from all unnecessary furniture: his sheets and body-linen be frequently

GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.
Opium.

Best in union
with cam

Antimonials not
often useful.

Blisters.

Diet and
regimen.

feeble habits, or in the advanced stage of low fever, requiring general or local bleeding. The treatment, necessary to subdue the local disease, lowers the general strength; the patient does not rally, and perhaps loses ground. In such cases, Dr. Tweedie finds a moderate quantity of wine, provided the pulse be soft, and the skin cool, is followed by excellent effects. When the fever assumes the petechial character, he also approves of wine. Dr. Tweedie offers much valuable advice on this part of the subject; and, perhaps, what he has stated, joined with the remarks of Dr. Wilson Philip and Dr. Marshall Hall on the same topic, will give the best general views of the doctrines, which should regulate the practice of venesection in fever. — Ed.

* Clinical Experiments, Histories, and Dissections. 8vo. Edin. 1780.

† From the stimulant effects of opium, it is generally regarded as an improper medicine in the acute forms of fever, especially when local inflammation exists. According to Dr. Tweedie, the delirium and wakefulness of sub-acute inflammation of the brain are best overcome by topical bleeding, and the application of cold lotions to the scalp; and, when the morbid condition of the brain, on which the want of sleep depends, is removed, the patient generally enjoys intervals of refreshing sleep. In other cases, a state of distressing restlessness, with obstinate wakefulness, remains. If, with these symptoms, the pulse, though soft, be rapid, the skin cool, the face pale, the tongue moist, and there be no effusion of the eyes, Dr. Tweedie approves of opium. If, however, its exhibition be followed by increase of delirium, thirst, and heat of skin, or, if the tongue become dry and the bowels confined, he recommends it to be discontinued. The preparations of opium, preferred by this excellent physician, are the muriate and acetate of morphia in half-grain doses. He has also found 15 grains, or ʒj. of camphor, joined with a quarter of a grain of the acetate of morphia, a valuable formula. On Fever, p. 227—229.

GEN. IV.

SPEC. II.

β E. Typhus

gravior.

Treatment.

Free ventila-
tion.Fumigations
when neces-
sary.

Lately decried;

but on false
principles.How acid
fumigations
probably act.Aroma of
plants.
Tobacco.Disinfecting
power of the
chloride of
lime.

changed, and be instantly taken out of the room; as should also the egestions of every kind.

Above all things, the chamber should be freely ventilated, which is infinitely the best way of purifying the air, and dissolving the febrile miasm as it issues from the body: upon which subject we have already touched. Where the ward or chamber is large, or the sick are remote from each other, simple ventilation by opening the opposite windows, or the windows and door, will be sufficient. But where the wards are small, or may not admit of sufficient ventilation, or the patients are numerous, fumigation with nitric or muriatic acid should not be neglected. At present, we have no reason for a preference, except that the vapour of the former appears to be rather more volatile and penetrating. Of late years there have been attempts to decry the use of fumigations, and especially by M. Von Mons and Dr. Trotter, who conceive that they rather increase than diminish the septic matter of the atmosphere. On which account, they advise the room to be frequently sprinkled with water, and a good fire to be maintained,—believing that febrile contagion is much better destroyed by pure aqueous vapour, than by any other means.

But this conception is founded upon a double hypothesis, and an hypothesis apparently mistaken upon both points: first, that febrile miasm, and septon, or the elementary matter of putrescency, are the same thing; and next, that this common principle is nitrous oxyde, or oxyde of azote, agreeably to the conjecture of Dr. Mitchell. Of septon, however, we know but little; yet, from the established power of hydrogen in exhausting or destroying animal irritability, it is more probable, that M. Morveau's conjecture of its being a combination of hydrogen with azote, rather than of oxygen with the same, is the real fact. But be this as it may, we have no more reason for believing that febrile miasm consists of either of these, than that it consists of animalcules of a peculiar kind, as was once contended for by Dr. Chandler.

Febrile miasm, we have reason to believe, is a peculiar and specific production; the chief properties of which I have already endeavoured to point out. Pure air unquestionably dissolves it; and hence there may be other gases capable of dissolving it also, and even more readily; or which, combined with pure air, may render the latter a speedier and more powerful solvent. And it is probable, that the vapours of the mineral acids act in this manner. In this respect they may be useful; but, if ever employed to supersede ventilation, the opinion of Dr. Trotter, that they do more mischief than good, will be completely established. The aromas of volatile plants are of no benefit whatever; and, if the fumes of tobacco were ever serviceable in the plague, it was most probably, as Dr. Cullen conjectures, from their exhilarating the spirits, like wine or opium, and diminishing the irritability.

[A few years ago, M. Labarraque discovered, that the chloride of lime, now generally employed instead of chlorine for bleaching, likewise possesses the power belonging to that gas of destroying putrescent effluvia. It is also suspected to have considerable power in destroying the effluvia of infectious disorders. Hence, its use is ordered by the French government in all hospitals and lazarettos. The powder should be dissolved in forty or forty-five parts of

water.* Such a lotion would undoubtedly have more effect against contagious effluvia than simple water: the skin, when hot and dry, might be freely sponged with it; and the room sprinkled with it. Indeed, the preparation called the hydrochloruret of lime is recommended by Dr. Reid, as an internal remedy, in certain stages of fever and dysentery.† It has also been given by Dr. Cloquet in doses of from 20 to 30 minims, in examples of gangrene, as well as applied to the part.‡ The chloruret of soda has also similar powers.§

GEN. IV.
SPEC. II.
β E. Typhus
gravior.
Treatment.

SPECIES III.

ENECIA SYNOCHUS.

SYNOCHAL FEVER.

COMPOUNDED OF CAUMA AND TYPHUS: IN ITS COMMENCEMENT RESEMBLING THE FORMER; IN ITS PROGRESS, THE LATTER.

IT is not necessary, after our copious histories of the two preceding species, to follow up the present, which is a mixture of both, through a detailed description of its course. It is certainly the most common form, under which continued fever makes its appearance in our own country; for it is but rarely that cases of fever occur, which preserve a strictly inflammatory character from the beginning to the end. It is in fact an inflammatory fever bent out of its proper career, often, perhaps, by the temperament upon which it has to act; but still more frequently, as Dr. Brocklesby has well observed, by confined and vitiated air, and hence dropping its inflammatory pretensions in the middle of its course. Its causes are therefore the same as those that produce inflammatory fever. Dr. Cullen has entered it into his catalogue of genera after Sauvages and Linnæus; but with a doubt whether he is correct in so doing. "Since many fevers," says he, "are neither altogether inflammatory, nor altogether nervous, they cannot be referred either to the synocha (cauma) or the typhus: and I have hence inserted the

GEN. IV.
SPEC. III.
The most common form of continued fever in the present day.
General character.

* See Professor Marc's Official Report; also Kopp's Reise in Deutschland und Frankreich, p. 198.; and Edin. Med. and Surg. Journ., No. lxxxix. p. 447.

† See Reid's Clinical Observations on the Efficacy of the Hydrochloruret of Lime, &c. Dub. 1827.

‡ See Alcock's Essay on the Chlorurets of Oxide of Sodium and Lime. 1827.

§ "In the cure of fever, we must aim, in the first place, at having free ventilation, and the most perfect cleanliness; plenty of washing, plenty of clean linen, and plenty of fresh air. With fresh air and fresh water, we may go on very well; but if there be any smell, which ventilation and washing will not remove, the chlorides, I need not say, are excellent things, sprinkled upon the bed, or the floor, &c. A solution of the chloride of lime ought to be put into the utensils which the patient employs, that no unpleasant smell may arise in the room — no contamination. When you first see a patient, if he be dirty, before prescribing any thing else, it is right to prescribe soap and water." Professor Elliotson's Lectures at Lond. Univ., as published in Med. Gaz. for 1832, p. 182.

GEN. IV.
SPEC. III.
Enecia syno-
chus.

Supposed by
Cullen to be a
variety of
typhus,
but is rather
more nearly
related to
cauma;

whence deno-
minated febris
inflammatorio-
putrida.

Varies in
course and
symptoms.

genus synochus, whose type is frequently seen in this country. Yet, between the typhus and synocha, I cannot place any accurate limits; and I doubt whether they should in fact be deemed genera, or have a different place allotted them." And, in his First Lines, he observes, "I am disposed to believe, that the synochus arises from the same causes as the typhus, and is therefore only a *variety* of it." To me, it appears rather to arise from the same causes as the cauma, for it commences with the cauma-type. The proper rank for all of them appears to be that of species; and the present system in the text-book, in allotting them this character, steers just a middle course between Dr. Cullen's actual arrangement and his real opinion. And in this view it is distinctly regarded by Dr. Stoll, who sometimes describes it as an inflammatory fever assuming a putrid guise; sometimes as equally inflammatory and putrid; and sometimes as an inflammatory fever passing into a saburral fever.* By Kausch, and other German pathologists, it is hence denominated febris inflammatorio-putrida.† It is, in many instances, the inflammatory typhus of Dr. Armstrong.

Occasionally it shows a considerable tendency to terminate its course abruptly by a critical sweat; it is sometimes peculiarly marked with yellowness of the skin; sometimes with great stupor of the head; and sometimes with inflammatory tension of the peritonæum. And it hence furnishes us with four varieties:—

- α Sudatorius.
Sweating synochus.
- β Flavus.
Yellow synochus.
- γ Soporosus.
Comatose synochus.
- δ Puerperarum.
Puerperal fever.
Childbed fever.

Carried off by a critical sweat in an early stage of its progress.
With yellowness of the skin, attended with a sense of burning heat.
Accompanied with stupor from the beginning.
Accompanied with an inflammatory tenderness of the belly: mostly occurring on the third day after childbirth.

General character.

α E. Synochus sudatorius.

Treatment.

β E. Synochus flavus.
General character.

The symptoms of the FIRST VARIETY open with great violence. There is usually an intense pain in the head, with a vehement vomiting and purging, which is rarely removed, and sometimes augmented, by an emetic: the skin is peculiarly dry and hot. The balance of the circulating system is here greatly disturbed, and there is an evident determination of blood to the head, and probably to the liver. Like the yellow fever, it rushes forward rapidly to a state of great sensorial debility; and is best checked in its progress by a free use of the lancet, which more than any thing else takes off the tendency to congestion, and the hardness from the pulse. A diaphoresis commonly breaks out soon afterwards, which proves critical, and should be maintained by diluent drinks, and small doses of antimonials or other relaxants.

In the YELLOW-TINGED SYNOCHUS there is a high degree of hepatic irritation, and consequently an excessive secretion of bile, part of which is absorbed and carried into the system: whence

* Rat. Med., vol. iii. pp. 97. 106. 113., iv. 61.

† Grüner Almanach, 1788, p. 37.

Galen denominates it *synochus biliosus*.* It is found chiefly in the summer season, among young persons of a bilious habit, and is generally produced, like the genuine cauma, by too violent exertion under a sultry sky. It is accompanied with intolerable thirst and sleeplessness. In few words, it is a *causus*, or ardent fever without any apparent remission; its symptoms, with this exception, are the same, and the same mode of treatment is demanded: for which the reader may turn to the second species of the preceding genus.

While the symptoms rage violently, there is sometimes a great determination to the head, with a sudden exhaustion of sensorial power; and hence, notwithstanding that this local affection is more severe and confirmed than in the first variety, there is a dull and obtuse, rather than an intense and pungent pain. It is the *SYNOCHUS SOPOROSUS* of Guarinon and Sauvages, as well as of the present system; and the continual fever of Sydenham for the year 1763. Among the chief symptoms, says he, was a coma, for the patient soon became drowsy and obscurely delirious. Occasionally, however, it was a direct lethargy, which continued for two or three weeks, during which nothing but a violent noise would rouse the patient; when, after opening his eyes, and being persuaded, perhaps, to take a little food or some medicine, he again fell into a sleep so profound, that Sauvages calls it a febrile cataphora. In some cases, however, instead of a lethargy, there was a low muttering delirium, in which the patient spoke incongruously and with fretfulness, with short snatchings of stertorous sleep interposed. The fever rarely terminated in less than fourteen days; and, when the lethargy prevailed, generally ran on to twenty-one or even thirty days. The first symptom of recovery was usually a capricious longing for some absurd kind of meat or drink. The head for many days still discovered great weakness, and even the muscles were incapable of supporting it in an erect position. Warm cordials were always mischievous: a free and repeated use of the lancet, with brisk purgatives, formed the best plan of cure, with diluting diaphoretics afterwards. Sauvages asserts, that blistering the head was serviceable. Epithems of ice-water over the whole head, repeated as soon as they became warm, would probably have proved far more beneficial, as soon as the vessels of the head had been sufficiently emptied.

We find the same fever still more frequently commencing with a like tendency to the peritonæum, instead of to the head, and running rapidly into a state of inflammation, with an imperfect attempt at suppuration; and especially where this membrane has been excited by a sympathetic action with the uterus or any other adjacent organ, or by exposure to the atmosphere in consequence of a wound through the abdominal integuments. And hence this disease occurs occasionally in cases of tapping for a dropsy of the abdomen, and still more frequently after labour: on which account, it is commonly known by the name of *PERITONÆAL, PUERPERAL, or CHILDBED FEVER*. From the days of Hippocrates to those of Boerhaave and Van Swieten, the uterus was supposed to be the chief seat of inflammation when the disease arises from this cause. But there is now no question that it originates in the peritonæum

GEN. IV.
SPEC. III.
β E. *Synochus flavus*.

γ E. *Synochus soporosus*.

Sydenham's description.

Treatment.

δ E. *Synochus puerperarum*.

Proceeding from, or combined with, peritonæal inflammation.

Uterus supposed formerly to be the chief seat of the disease.

* De Differ. Febr., cap. ii. De Crisibus, cap. ii.

GEN. IV.
SPEC. III.
§ E. Synochus
puerperarum.
Description.

itself, and that the uterus is often very little affected; and this too, though the inflammation should spread, as it often does, to other organs in the vicinity.*

The disease usually commences on the second or third day after delivery; though, sometimes, it occurs rather later, and, according to Professor Frank, sometimes a little before delivery.† [Dr. Blundell has known death occur, with all the symptoms of puerperal fever, within the first four-and-twenty hours after parturition; and Dr. Haighton used to relate the case of a woman who died of a puerperal fever, which commenced ten or twelve days after delivery. According to Dr. Blundell, the later the attack, the less is generally the pertinacity of the symptoms.] It is marked by all the common symptoms of a severe febrile incursion, in combination with the tenseness and tenderness of the belly. The muscles of the back and hips are in great pain; the abdomen is tender, often acutely painful, and the pain is greatly increased by pressure, which peculiarly distinguishes this disease from enteritis; and, as the diaphragm is affected by contiguous sympathy, the breathing is also short and laborious, accompanied with most distressing anxiety. [In puerperal fever, the pulse is noted for its extraordinary frequency. Dr. Blundell says that it is scarcely ever below 115 in a minute, unless the disease be yielding to remedies; and more commonly it rises to 120, 130, or 140; and he has

Great fre-
quency of the
pulse.

* Puerperal fever is much better understood at the present time, than when Dr. Good wrote this part of his work; and instead of its being essentially a disorder proceeding from peritonitis, as was once the common belief, it is only sometimes accidentally conjoined with it. Hence the idea of the case being the same as peritonitis from tapping is completely erroneous. "From the 1st of January, 1827, to the 1st of June, 1832," says Dr. Lee, "162 cases of well-marked puerperal fever came under our immediate observation in private practice, and in the British Lying-in Hospital, and other institutions in the western districts of London. We watched the symptoms and progress of these cases with the closest attention, observed the effects of the different remedies employed, and, where death took place, we carefully examined the alterations of structure in the uterine and other organs. Of fifty-six cases, which proved fatal, the bodies of forty-four were examined, and in all there was found some morbid change, the effect of inflammation, either in the peritonæal coat of the uterus, or uterine appendages, in the muscular tissue, in the veins, or in the absorbents of the uterus, which accounted, in the most satisfactory manner, for all the constitutional disturbance which had been observed during life. The peritonæum and uterine appendages were found inflamed in thirty-two cases; in twenty-four cases there was uterine phlebitis; in ten there was inflammation and softening of the muscular tissue of the uterus; and in four the absorbents were filled with pus. These observations are subversive of the general opinion, now prevalent in Europe and America, that there is a specific, essential, idiopathic fever, which attacks puerperal women, and which may arise independent of any local affection in the uterine organs, and even prove fatal, without leaving any perceptible change in the organization of any of their different textures. As the constitutional symptoms thus appear invariably to derive their origin from a local cause, it would be more philosophical, and more consistent with the correct principles of physiological arrangement, to banish entirely from medical nomenclature the terms *puerperal* and *childbed fever*, and to substitute in their place *that of uterine inflammation*, or inflammation of the uterus and its appendages in puerperal women. The terms *puerperal peritonitis* and *peritonæal fever*, employed by some English and foreign physicians, are not less objectionable than puerperal fever; for, in many of the fatal cases, there is no proof whatever of the existence of any affection of the peritonæum." Dr. R. Lee, in Cyclop. of Pract. Med., art. PUERPERAL FEVER.

— Ed.

† De Cur. Hcm. Morb., tom. ii. p. 189. 8vo. Mannh. 1792.

counted pulses of 165 or 170.] The head rarely suffers much at first; but, in the progress of the disease, is apt to become stupid and comatose. The flow of the milk and of the lochia are usually suspended, though the latter is not always so; but, in this last case, the discharge is thinner and more acrid. The stomach is sometimes, but not generally, troubled with sickness, and frequently discharges an offensive porraceous saburra; and a troublesome diarrhœa attacks the bowels.*

In the opinion of Mr. John Hunter, the disease takes place in consequence of an injury done to the peritonæum, as forming a cavity, by which its present state is either suddenly changed or rendered imperfect. The injury, done to the peritonæum in the case of women after delivery, he ascribes, as his sentiments are delivered by Mr. Cruikshank, to two causes. Sometimes it proceeds from a want of disposition in the womb to recover itself after labour; by which the peritonæum, as a cavity, must necessarily be affected. At other times from a too sudden emptying of the abdomen; whence the peritonæum cannot always recover itself so as to be properly adapted to its new condition. This last cause, he observes, may also hold with men after the operation of the paracentesis. But, in them, besides the sudden emptying of the abdomen, there is the additional circumstance of a wound, which renders the peritonæum, as a cavity, imperfect. When an inflammation of the peritonæum occurs, it most frequently happens, as he still farther remarks, that it spreads over all the cavity of the abdomen. An extravasation of fluids takes place into that cavity, mixed with pus. The different viscera adhere by their peritonæal coats. The intestines are distended with air. And the irritation, thus induced, kills the patient long before granulations, or an obliteration of the cavity in the second method, can occur.†

Neither of these two causes, however, by themselves will often, if ever, produce the fever before us, or even peritonæal inflammation alone. For the uterus is perpetually exhibiting a morbid enlargement, without a disposition to recover itself: and the abdomen, sudden evacuation, while no such fever ensues. There must co-operate a peculiar temperament, or a peculiar condition of body at

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δ E. Synochus
puerperarum.

Explanation
given by J.
Hunter.

These causes
rarely adequate
of themselves.

A peculiar
temperament
of body neces-
sary as an ac-
cessory.

* "If we consult the works of the most celebrated writers in this country on puerperal fever, it will clearly appear," says Dr. Robert Lee, "that they all describe the disease as commencing with a sense of soreness, or exquisite tenderness, in the region of the uterus; and that where it proves fatal, the appearances on dissection are such, as afford unequivocal proofs of inflammation of one or more of the pelvic and abdominal viscera. Strother, Burton, Millar, and Wallace Johnson, state, that the distinguishing marks of the disease are pain of the hypogastric region, abdomen and loins, and that relief often follows venesection." (Cyclop. of Pract. Med., loc. cit.) These unintended confirmations of the modern doctrine (which Dr. Good represents as having been also that of Hippocrates and Boerhaave) are highly deserving of attention.—Ed.

† Edin. Med. Comment., vol. iii. p. 322. Now that the pathology of puerperal fever is better understood, these reasonings about the cause of peritonitis, the imaginary essence of the disease, are not of great importance. That the peritonæum is frequently inflamed, is undoubtedly true; but that it is always so, is not the fact. In 222 cases, examined after death by M. Tonellé, the uterus was affected in 197, and the peritonæum in 193. There was pus in the uterine veins and lymphatics in 134 cases. Des Fièvres Puerpérales observées à la Maternité de Paris, pendant l'Année 1829; Arch. Gén. de Méd., Mars et Avril, 1830.—Ed.

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puerperarum.

A peculiar
temperament
of the atmo-
sphere.

Hence occa-
sionally be-
comes an epi-
demy.

Contagious
from miasm
generated as in
typhus.

Proofs of in-
fection.

Contagious
effects, why
limited to
puerperal
patients.

the time; and, in puerperal patients, there is especially the general pyretic excitement which necessarily follows the very great change in various organs after delivery, and the transfer of accumulated action from one organ to another. Another accessory is also frequently found in the constitution of the atmosphere; for whatever change is most calculated to produce fever from a morbid excitement of the abdominal viscera, cannot fail to co-operate in the production of this disease from a local cause. I have already observed, that such a change most usually occurs in autumn, and have stated the grounds on which it depends, under the history of *epanetus autumnalis*, to which the reader may turn at his leisure.*

And hence, so far as I have observed, a tendency to peritonæal or puerperal fever occurs more frequently at this season, than at any other: and, on this account, it is said by Dr. Douglas of Dublin, M. Vandenzande†, Dr. Blundell, and some other writers‡, to happen occasionally as an epidemic.§ There is much reason, indeed, for regarding it in this last view; for as most of the auxiliaries that unite in the production of contagious miasm are present in a lying-in chamber, such miasm is frequently the result; often indeed, as we have reason to believe, generated after the manner of typhous miasm, and completely elaborated in the circulating and secreted fluids of the patient herself. Of this fact, indeed, we seem to have a striking illustration in the official report of the malignant puerperal fever that raged so fatally in the lying-in department of the General Hospital at Vienna in 1819 ||; but there can be no longer any question, after the accounts of the disease published by Dr. Gordon of Aberdeen, and Dr. Young of Edinburgh, as it appeared in the lying-in infirmaries of these cities; in which woman after woman continued to be infected to a very great extent, and especially where they had close communication with puerperal patients, or had even been attended by nurses or midwives, who had previously attended the latter without sufficiently changing their malignant dress. This disease was only subdued by the ordinary means employed to exterminate contagious miasm, such as great cleanliness, repeated change of sheets and body-linen, free ventilation, and a total separation of those who were labouring under the disease, from those who were about to be confined.¶

In all kinds of contagious fevers, we find, that some persons are more liable to be infected than others from incidental circumstances; and, as I have already had occasion to observe, in laying down the laws of febrile miasm so far as we are at present acquainted with them, the miasmatic corpuscles are modified in a few of their properties by the accessories to which they are exposed, or by which they are produced. And, by bearing these facts in mind, we shall have no difficulty in accounting for the limitation of this contagious fever

* See Cl. III. Ord. I. Gen. III. Spec. II.

† Obs. pratiques sur la Maladie connue sur le nom de Péritonite, et de Fièvre puerperal. Anvers, 8vo. 1821. — J. P. Frank, De Cur. Hom. Morb., tom. ii. p. 197.

‡ Treatise on the Puerperal Fever, illustrated by Cases which occurred in Leeds and its vicinity in the years 1809—1812. By William Hay, jun. &c.

§ Clark, Edin. Med. Comment., vol. iii.

|| Edin. Med. and Surg. Journ., No. lxxx. p. 83.

¶ Compare Dr. Campbell's Treatise on the Epidemic Puerperal Fever, as it prevailed at Edinburgh in 1821—2. Edin. 8vo. 1822.

to puerperal women, and the exemption possessed by persons who are not under the same circumstances. For, operative as the miasm unquestionably is, where the predisposition exists, and the abdominal organs are thrown out of the balance of healthy action, it is inert where no such predisposition is to be found, and these organs are in elastic vigour. Dr. Douglas extends this view of the case further than many pathologists; for he conceives that women, whether pregnant or nursing, or for several months after confinement, though not nursing, are susceptible of the disease upon the application of contagion.*

But whether the miasm, thus generated, be the common febrile miasm we have contemplated in several of the preceding species, merely modified in its powers by accidental circumstances, or a contagion specific and peculiar to itself, is a question, which, at present, we have not the means of determining.

I have said, that, in the inflammation which takes place, there is an imperfect attempt at suppuration. The fluid secreted or effused

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puerperarum.

Facility of acquiring the disease as supposed by Douglas.

Whether febrile miasm modified, or a specific contagion.

Imperfect attempt at suppuration.

* Report on Puerperal Fever. Dublin Reports, vol. iii. p. 145. Dr. Robert Lee does not attach much importance to this view of the subject; and, according to the observations which he made on the epidemic typhus of Edinburgh in 1816 and 1817, and during the last five years in this metropolis, lying-in women are rarely affected with common typhus. "It is to the uterus, which is left in a condition after delivery, in which no other organ of the body is ever similarly placed, and which renders it peculiarly liable to attacks of inflammation, that we are to look for an explanation of all the phenomena of puerperal fever." (Cyclop. of Pract. Med.) Supposing this doctrine to be correct, we must presume that the statements of puerperal fever being contagious, and capable of exciting a similar disorder in other women, cannot be free from doubt. Dr. Hulme maintains that it is not more contagious than pleuritis, nephritis, or any other inflammatory disease. "M. Tonellé, who has recorded the history of the most fatal epidemic which has ever occurred in Paris, asserts, that the idea of contagion was clearly out of the question there; for, in the Maternité, the women, who were newly delivered, had each a separate apartment, and yet were attacked with the disease; while, in the sick ward of the hospital, no instance of the propagation of puerperal fever ever occurred. The evidence of M. Dugès against the doctrine of contagion is equally strong; for, he states, that, in numerous instances, pregnant women have been placed in the infirmary, where they were surrounded by cases of peritonitis, without imbibing the germ of the disease; and that still more frequently he has seen women, newly delivered, brought with some other complaint into the infirmaries, who did not contract the reigning malady, notwithstanding the miasmata which surrounded them. In no instance, has he observed a midwife, charged with the care of two women at the same time, communicate peritonitis from a sick to a healthy individual, as is reported to have happened in London; and never has this inflammation been propagated from patient to patient in the wards set apart for the reception of healthy women. (Baudelocque sur la Péritonite Puerpérale. 8vo. Paris, 1830.) "In the earlier description, however, of uterine inflammation, it is referred, not only to the corrupted atmosphere of hospitals, but also to contagion. In the Dublin Lying-in Hospital, the Edinburgh Infirmary, the General Lying-in Hospital at Vienna, and in most of those in this metropolis, it has raged as an epidemic, at different periods, with great violence, and appeared to be propagated by contagion." (Dr. R. Lee, in Cyclop. of Pract. Med., loc. cit.) This able physician inclines to the doctrine of contagion; but candidly admits, that his facts have not, perhaps, been sufficiently numerous to dispel every doubt on the subject. His valuable writings on this disease particularly claim the notice of the profession. The researches of Dr. Lee confirm the fact, that inflammation of the uterine organs, like inflammation of the lungs, and other affections assuming an epidemic form, takes place more frequently in one season, than another, and that, at one period, the peritoneal covering of the organ is the tissue most commonly affected, whilst, in other seasons, the deeper tissues are almost invariably found inflamed. — Ed.

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§ E. Synochus
puerperarum.

Inflammatory
range often
very extensive.

Frank.

General treat-
ment.

is usually a whey-like material, or milky ichor, or, as Mr. Cruikshank has described it, an extravasated matter mixed with pus. But Dr. Hulme* asserts, that he has sometimes found genuine pus apparently secreted without ulceration; and Dr. Meckel informs Baron Haller, that he has witnessed the same very extensively. † The nature of the fluid will, indeed, entirely depend upon the vehemence and rapidity of the inflammatory process. Where this is less violent, the secretion, as from the surface of other serous membranes, may be purulent, or even genuine, pus, and has sometimes amounted to several pints; but, where more violent, it will be a milky, caseous, or whey-like serum. It is rarely, however, so mild and temperate in its march as to produce pus; often running on, as Dr. Hulme has observed, to a state of gangrene at once; and, in some instances, has been found to involve the intestines, omentum, and all the neighbouring viscera, in the common mischief, as has been abundantly established by post-obituary examinations. ‡ And, hence, the uterus itself has sometimes participated in the inflammation, and has shown pus or gangrene, according to the vehemence and rapidity of the morbid influence. § The secreted fluid, from its abundance, is called, by Professor Frank, “*acutus purulentusque hydrops*,” who further tells us, that he has sometimes traced it in the lungs, pleura, cavity of the chest, and even in the pericardium, where these organs have associated in the inflammation. ||

The general treatment of this disease should closely resemble that already laid down for the severer varieties of the malignant remittent, which it very much resembles, with the exception that

* Treatise on the Puerperal Fever.

† Epist. ad Haller. Script., vol. iii.

‡ Hulme, ubi supra. — De la Roche, Recherches, &c.

§ Bang, Act. Soc. Hafn. 1. One great mistake in Dr. Good's account is that of supposing the peritonitis to be the essential affection, and the inflammation of the uterus and its appendages to be merely an occasional circumstance. The same mistake prevails in the works of Bichat, Pinel, Dr. J. Clarke, the late Dr. Gooch, and other men of eminence. Dr. Gooch, in his dissections, seems to have been satisfied with simply inspecting the peritonæal covering of the uterus; but Dr. Robert Lee is inclined to believe, that “if he had carefully examined the spermatic and hypogastric veins, the absorbents, the uterus and its appendages, with the sub-peritonæal tissues, he would frequently have found acute inflammation, or some of its products. The following is the general inference drawn by Dr. Lee respecting the nature of puerperal fever:—“That inflammation of the uterus and its appendages must be considered as essentially the cause of all the destructive febrile affections which follow parturition, and that the various forms they assume, inflammatory, congestive, and typhoid, will, in a great measure, be found to depend on whether the serous, the muscular, or the venous tissue of the organ, has become affected.” (Med.-Chir. Trans., vol. xv. part ii. p. 405. 1829.) A large proportion of typhoid puerperal fevers arise from uterine phlebitis, and its consequences. In the report of the epidemic puerperal fever, which occurred in the General Hospital at Vienna in 1819, we are informed, that the accession of fever was always preceded by marked changes in the whole system, particularly in the uterus, clearly indicating an inflammatory state. Med. Annals of the Austrian States, 1822; and Dr. Robert Lee's Paper in Cyclop. of Pract. Med. — Ed.

|| De Cur. Hom. Morb. Epit., tom. ii. p. 196. 8vo. Mannh. 1792. Whoever has studied the nature and effects of phlebitis, will here discover at once evidence of the existence of inflammation of the veins of the uterus and its appendages. Phlebitis, in its extensive and fatal forms, commonly occasions inflammations and depositions of pus in various organs and tissues. — Ed.

the fever is continued, instead of being remissive; and that the local irritation is seated in the peritonæum, (or, as Dr. Good should have said, in the uterus and its appendages,) instead of in the liver or any other organ. This inflammation must be subdued, and that speedily, or the patient will perish; and hence abstraction of blood and calomel purgatives are the arms on which we have chiefly, if not solely, to depend; and both should be employed decidedly, and to as great an extent as we dare.

Eighteen or twenty ounces of blood should be drawn from the arm, as soon as possible after the commencement of the disease, and repeated within twelve hours, if necessary, and the strength will allow: but if venesection have not taken place before the third day, the debility will have gained so high an ascendancy, and the general symptoms put on so putrescent a complexion, that little benefit is to be gained from it. The bowels should, at the same time, be moved by six or eight grains of calomel, given in the form of a pill; and the same preparation, to the amount of three or four grains—Dr. Douglas advances the dose to not less than ten grains—should be continued every six hours till the tension and soreness of the abdomen have abated. And it will often be useful to accompany the calomel with one or more doses of castor oil, or the essential oil of turpentine, or both combined.

Dr. Vandenzande depends upon a free exhibition of calomel without venesection, which, after the manner of Dr. Hamilton of Ipswich, he unites with opium; and he boasts of the certainty of success which this treatment has developed; though, in conjunction with opium and calomel, he sometimes employs mercurial friction.* There can be no question of the benefit of a liberal use of calomel in an early stage of the disease; but, to let it supersede the use of the lancet, is to abandon our first chance of success, and to encounter an unnecessary peril.

It happens not unfrequently, however, that the patient's frame is so weak and delicate, that we should risk more by drawing blood generally, than even by leaving the case to nature; as it does also that the stomach and bowels are, from the first, in a very high degree of irritation, with violent purging and vomiting, and will not bear any additional stimulant. Our wisdom is here to yield to circumstances, and let the general rule admit of particular exceptions. Instead of the lancet, we should have recourse to leeches, and, in this manner, remove twelve ounces of blood at the least; and unite opium with smaller doses of calomel. It does not follow that calomel in such a combination will increase the irritation of the stomach or bowels; I have often seen the contrary; and that by the exhibition of two or three grains with one grain of opium, repeated every five or six hours, the irritation has yielded to the commencement of a new action.

It is also in such cases of extreme debility that the essential oil of turpentine has often been found highly beneficial when employed internally by itself; for, while it operates as a mild aperient, it acts as a counter-irritant, and hence directly influences the morbid state of the peritonæum, while the pulse is supported by its stimulant

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§ E. Synochus
puerperarum.
Treatment.

Venesection.

Cathartics.

Calomel.

Neither advisable in some cases.

Local depletion.

Opium.

Essential oil of turpentine.

* Observations pratiques sur la Maladie connue sur le Nom de Péritonite, ou de Fièvre puerperale, &c. 8vo. 1821.

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SPEC. III.

§ E. Synochus
puerperarum.

Treatment.

Fomentations.

Best and sim-
plest mode of
application.

Diaphoretics.

Camphor.

Cold epithems
to the abdomen
instead of
warm.

power, and a pleasant moisture is sometimes diffused over the surface. It is, in truth, with the exception of camphor, the only cordial we can safely venture to employ. For the purpose before us, the dose should be about two drachms; which may be repeated every two or three hours.*

Warm and anodyne fomentations to the abdomen are usually prescribed at the same time, and are often found palliative, particularly the essential oil of turpentine, which may be used externally as well as internally; but the common mode of applying them makes the bed wet, and gives great fatigue to the patient. And hence, I have ordinarily prescribed a large piece of folded flannel wrung out forcibly in as hot water as can be borne, to be applied over the whole of the pubes and abdomen, and covered by a broad flannel or linen swathe passed under the loins and folded over the epithem of reeking flannel, which is to remain for many hours, or till it becomes dry, as all that is wanted in this application, as in a common bread-and-water poultice, is warmth and moisture; the flannel answers the purpose as well as the bread; and whilst I do not recollect a single instance, in which this application has not been soothing and serviceable, I have never met with a case in which a chill has been complained of.

In the mean time, a diapnoë, or breathing perspiration on the surface, should be attempted by small doses of ipecacuan, or Dover's powder, and with the addition of a solution of acetate of ammonia; and if the debility be very considerable, we may employ free doses of camphor, beginning with half a scruple, and proceeding to half a drachm at a time, every four or five hours, with great advantage.

If this plan should not answer, and the skin be still hotter, drier, and more pungent to the touch, the pulse quicker and more wiry, and the tongue more deeply furred, it may be advisable to exchange epithems of hot for those of cold or even ice-water, as already recommended in cases where the head is chiefly affected, instead of the peritonæum (uterus and its appendages). I freely confess that I have not tried this plan myself hitherto, but it is strongly recommended by Loeffler and other physicians of great repute; and as it is a practice in common use in our own country in the case of flooding, without any evil resulting from it, we have no reason to expect any harm from it in the case before us; for the sensibility is here still more obtunded than in flooding, and nearly as much as in deliquium.†

* See Edin. Med. and Surg. Journ., 1822, p. 538. Communication from Dr. Hy. Paine.

† The practice recommended by Dr. Good is not materially different from what has the sanction of those writers, who have given a better theory of puerperal fever. Where *inflammation of the peritoneal coat of the uterus* is fully developed, and where the affection occurs in a severe sporadic or epidemic form, Dr. Lee is an advocate for general and local bleeding, mercury, opium, cathartics, diaphoretics, and blisters. He begins with taking away from twenty to twenty-four ounces of blood, and, if necessary, lets the use of the lancet be followed by the application of two or three dozens of leeches to the hypogastrium, afterwards promoting the bleeding from the bites by means of fomentations, or a thin linseed poultice. At the same time he prescribes ten grains of calomel, with five of antimonial powder, and gr. iss. or gr. ij. of opium, or with gr. x. of the pulv. ipecac. comp.; and these medicines are to be repeated every three or four hours,

until the symptoms begin to subside. After the second dose of calomel, he has often seen great benefit result from giving the infusion of senna with salts, and repeating it according to circumstances. Dr. Lee finds, that there are few cases in which it is requisite to repeat the bleeding from the arm; and, where such practice does become necessary, not more than ʒxii. or ʒxiv. of blood should be drawn. After the violence of the attack has been subdued, the calomel is to be continued every six hours, until the mouth is affected, or the uterine tenderness has been removed, but only in doses of gr. v. combined with the same quantity of the pulv. ipec. comp. When the attack is less formidable, the depletion, mercury, and opium, need not be carried to the extent above recommended. With respect to the oil of turpentine, Dr. Lee seems to place no confidence in its usefulness, the statements about its effects, delivered by Dr. Brennan, who first employed it in the treatment of puerperal fever, and by Drs. Douglas, Joseph Clarke, and Armstrong, being altogether contradictory. The same view is taken of colchicum and digitalis. As for emetics, advised by Doulcet, Dr. Lee has met with no case in which he considered it safe to administer them in any stage of the complaint. The application of blisters or oil of turpentine to the hypogastrium, after general and local bleeding, has often been found advantageous. The warm-bath, and even warm injections into the uterus, are favourably spoken of by some foreign practitioners. When the stomach is severely disturbed, and not relieved by anodynes and saline effervescing draughts, Dr. Lee recommends ʒj. of subcarbonate of potash to be dissolved in ʒv. of aqua menth. vir., and ʒj. of the mixture to be given every two or three hours. When the inflammatory symptoms have been subdued, and the patient is left in a state of great exhaustion, quinine, ammonia, and wine are to be administered. With regard to the treatment of *inflammation of the uterine appendages and of the deep-seated tissues of the uterus itself*, whether of the absorbents, veins, or muscular structure, Dr. Lee finds the symptoms from the commencement to contraindicate general blood-letting. He approves of leeches and fomentations, where the pain is severe. The French practitioners confide in mercury, so employed as to excite salivation; but Dr. Lee appears to have no reliance on this, or any other means yet suggested for the relief of inflammation of the deep-seated tissues, the veins, absorbents, &c. of the uterus. (See Cyclop. of Pract. Med.) As M. Tounellé has noticed, the presence of pus in the vessels, and its necessary transmission through the circulation, causes a rapid and palpable infection of the blood, and various phenomena which communicate a specific character to the fever. It is then the fever of phlebitis, which is known to be often complicated with inflammation and depositions of pus in different textures, viscera, and regions of the body. The reader will find some valuable observations on puerperal fever in Dr. Ryan's Manual of Midwifery, p. 635. ed. 2., where references to some of the best works on the subject will be found. — Ed.

GEN. IV.
SPEC. III.
δ E. Synochus
puerperarum.
Treatment.

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